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VETERINARY MEDICINE

MAY 1943

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No. 5

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Chicago, U.S.A.

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The phenomenon of agglutination of bacteria by specific antisera was first observed by Gruber and Dunham in 1896.

A nanny goat is cheap at $70 to $100 (in Britain), because five pints of milk a day are regarded as a boon surpassing the nectar of the gods.—*Nat'l Humane Rev.*

In experiments with animals it has been found that suspensions of sulfanilamide or sulfathiazole in soybean oil are of value in chronic osteomyelitis and other types of infected wounds.

Soybean plants from one acre may produce up to 200 pounds of *"soy wool"* fibers made from the bean after the oil has been extracted. This is used in fabrics instead of wool from sheep.—*S. N. L.*

Germany has little time to spare to deal with the severe outbreak of foot-and-mouth disease in her territory. It is consequently spreading through the occupied countries, according to the head veterinary surgeon of Holmstad, Sweden. The disease has reached Norway and is being carried into Sweden by the German leave trains. Each train carries a pig or so to eat the food left by the soldiers. These animals are the carriers.—*The Daily Telegraph (London).*

Pestilence used to be something visited upon sinners by the angry gods; now it is visited upon mice and rabbits by men in search of knowledge.—*Plague on us.*

George Washington first introduced alfalfa to this country. It was called lucerne after the Swiss city from which he imported the seed. He also imported the first Jacks and was the first mule breeder in this country.

The value of food producing animals (in Britain) has increased considerably and the call for the services of veterinarians has placed that profession in an almost hallowed category, it being practically the only one which is free from conscription for other war service.—*Nat'l Humane Rev.*

The degree of Doctor of Veterinary Medicine has been granted, posthumously, to Romke Steensma by the Michigan State College. Steensma lacked but a few months of graduation when he left the college in February, 1941, and returned to his home in Holland and enlisted in the air corps of the Royal Dutch Army. He was killed in Java in January, 1942, the first Michigan State College student to lose his life in the present war.

Nine Hundred Veterinary Offices to Be Commissioned in 1943

The 1943 recruiting program of the Surgeon General of the U. S. Army includes the appointment of 900 qualified veterinarians to the Veterinary Corps, at the rate of 75 commissioned officers per month.

Each state Procurement and Assignment chairman prepares a monthly quota list of veterinarians who are apparently suitable for commissioning in the army, and the central office of the Procurement and Assignment Service communicates with the veterinarians listed and invites them to apply for service with the armed forces, enclosing a reply card, which when returned is turned over to the state chairman. Notice of availability of a particular veterinarian within his jurisdiction is given by him to Officer Procurement Service.

On receipt of notice of availability in regard to an individual veterinarian, the officer procurement district office contacts him and arranges for an interview, advising him at the same time as to the papers which he must furnish and the steps he must take. The district office interviews each candidate for character, integrity, reputation and qualification for commissioning as an officer. The investigation does not extend to an appraisal of professional qualifications. When a request is made by the district office the veterinarian must complete the papers and take the steps about which he has been previously told within 14 days from the date of the request. The Officer Procurement Service processes the papers of all veterinarians whose availability for commissioning in the Army of the United States has been determined by the War Manpower Commission.

As soon as the candidate's processing is completed, the fully processed papers are forwarded by air mail by the field office direct to the office of the Surgeon General of the Army.

The decision as to grade and appointment to be recommended for each candidate rests with the Surgeon General.

At present there is no restriction as to the area for recruiting the 900 veterinary officers which are to be commissioned.

Prior to 1943 the Medical Department, U. S. Army, commissioned many students in the Medical Administrative Corps who remained on inactive status pending completion of their medical education. Veterinary students, who have been previously commissioned and now hold appointments in the Officers' Reserve Corps in other branches of the service, have been similarly deferred. During 1943 the existing commissions of these veterinarians may be terminated at their own request, under certain circumstances and when qualified, they may be appointed officers of the Veterinary Corps. Officer Procurement Service has no processing or other function in regard to such appointments. The appointments of individuals here referred to will be handled by these individuals directly with the Surgeon General. Inquiries in regard to such appointments should be referred to:

Procurement Section,
Military Personnel Division,
Office of the Surgeon General of the Army,
1818 H Street N. W., Washington, D. C.

* * * *

The Army, Navy, and Lend-lease will require 400 millions pounds of dried whole eggs in 1943. This is the equivalent of one billion two hundred million dozen shell eggs, and is 40 times the total quantity of eggs dried for all purposes in 1940. All egg-drying plants are now running at capacity, 22 hours daily.

* * * *

Medical Administrative Officer Candidate School Discontinued

The gradual discontinuance of the Officer Candidate School of the Medical Field Service School, Carlisle Barracks, Pennsylvania, was begun at the graduation of the 11th Class in December, 1942. Plans called for completion March 1, 1943. To offset this discontinued training of the Medical Administrative Corps, the number of medical department officers trained for field duty will be greatly augmented.

Equine Encephalomyelitis in 1942

THE report of Chief Mohler on infectious encephalomyelitis in the United States in 1942 sets the total number of cases reported to the Federal Bureau of Animal Industry at 4,939, the smallest since 1936. Cases occurred in 35 states but in only 12 states, Iowa, California, Idaho, Illinois, Indiana, Kansas, Michigan, Minnesota, Missouri, Nebraska, Oklahoma and South Dakota, was the incidence of even mild epizootic proportions.

The fatality rate was 30%, somewhat higher than in preceding years. It was 100% in Delaware, Maryland, Georgia and Arkansas; 91% in Michigan, 90% in Louisiana and 86% in Florida. Kansas and Wisconsin with 19% reported the lowest case mortality. Iowa reported nearly one-fourth of the total number of cases (1217) and the largest number of deaths (262). Nebraska with 137, Oklahoma with 114 and Michigan with 93 deaths, ranked second, third and fourth in the number of animals lost as a result of encephalomyelitis.

The number of "out of season" cases occurring in 1942 was large. Of 2946 cases reported by months 12 occurred in the first four and 85 in the last two months of the year. Since 1936 the western strain of the virus has been typed in 18 states and the eastern strain in 13 states. Both strains have been typed in Alabama, Texas and Michigan. In 17 states the strain of virus has not been identified. Three states, Pennsylvania, Tennessee, and West Virginia, have not reported cases.

The outbreak of eastern type encephalomyelitis in Michigan last year and the fact that the strain of virus in 18 states has not been identified, poses a real problem to a veterinarian when called upon to vaccinate horses for the prevention of this disease. Shall he vaccinate against the western strain or against the eastern strain? The army has solved the problem with entire success for the past several years by vaccinating against both strains of virus. Apparently there is no other entirely safe procedure.

Vaccine sufficient to vaccinate one million animals was produced, but veterinarians reported the vaccination of only 251,585. Presumably most of the remainder of the vaccine was used by laymen. Eighty-nine animals developed the disease more than 10 days after receiving the second dose of vaccine. This is an incidence of one case in 2826 vaccinated animals. This record is not good enough considering the probable light-exposure. To the end of 1941 the army had vaccinated 123,000 animals with no case of the disease developing in a vaccinated animal. Of the large number of animals vaccinated against encephalomyelitis in experiments leading to the development of the chick vaccine and in testing it, its record of efficiency has been extremely high, even in experimentally inoculated cases. Yet last year the disease was approximately one-third as prevalent in vaccinated as it was in unvaccinated animals in the same counties. In 1941 it was reported[1] that the incidence of the disease was as high among horses vaccinated by laymen as it was in unvaccinated animals in the same counties. The complete failure of protection in this instance was charged to injection of the vaccine subdermally. A veterinarian could make that mistake only through indifference, yet factors other than failure of the vaccine must account for some of the cases that developed after vaccination last year. Some such cases can be charged to failure of the animal organism. More were doubtless due to using a vaccine of one strain when the exposure was to the other strain, possibly an occasional dose of the vaccine was inactive, but allowances for all these leave unexplained the majority of the cases that occurred in vaccinated animals. Had 1942 been a year of wide spread encephalomyelitis of epizootic proportions and the exposure extensive, the showing made by the vaccine might have been very disturbing.

[1]Encephalomyelitis in 1941. *Veterinary Medicine* 36:9 p. 444.

National Council on Poultry Viability Organized

IN ORDER that the 1943 poultry production quota of the government may be attained, more chicks must be hatched and fewer losses incurred. A realization of this fact by poultry industry leaders and officials of the U. S. Department of Agriculture led to the formation of a Poultry Industry Advisory Council, composed of representatives of every phase of this industry. Included in this group are men interested in production, research, instruction, extension, veterinary service, processing and hatching of poultry, feed manufacturing and distributing, and poultry equipment manufacturing.

The purpose of this organization, as promulgated at the initial meeting, held in Chicago, March 16-17, includes publicity, through poultry, farm and veterinary journals, by radio and through contact with producers at meetings. Timely information for the poultry producer to aid him in reducing the mortality in his flock will thus be made available.

As organized, this poultry industry advisory council has a director from each of the seven districts into which the states have been divided. These men compose the executive committee of the council. A publicity committee of five members has charge of the dissemination of the programs, which are being prepared on (1) breeding and rearing, (2) laying houses and (3) turkeys.

In addition to the position as secretary of the advisory council, Dr. Cliff D. Carpenter—lent to the government by Allied Mills—was appointed to direct and coordinate the activities of the representative poultry committees and to collaborate with the Bureau of Animal Industry through the chief, Dr. John R. Mohler, in putting into effect the objectives of the poultry viability program.

Instruction and information on all phases of poultry management, nutrition and disease control will be made available, through the representatives on the council, to the cooperating interested groups and, first of all, to the producer himself.

★ ★ ★ ★

★ ★ ★ BUY WAR SAVINGS STAMPS AND BONDS

Beaudette cites pox and laryngotracheitis of poultry as examples of disease against which specific preventive measures have been developed. Failures of attempted immunizations may be the responsibility of the diagnostician who advised the use of the vaccine, the manufacturer of the vaccine, the agency which authorized its production and distribution or the person who applied the vaccine. Immunization in flocks infected with coccidiosis or other parasites may cause deaths. Egg propagation of viruses offers the surest means of producing a product free from pathogenic bacteria and viruses.

EXECUTIVE COMMITEEE OF THE POULTRY INDUSTRY ADVISORY COUNCIL

Leon Todd, Dist No. I; Don M. Turnbull, Dist. No. IV; Dr. Cliff D. Carpenter, Secretary of Advisory Council; William R. Archer, Dist. No. V; Dr. O. B. Kent, Dist. No. III; Dr. Charles B. Cain, Dist. No. II.

Increasing Livestock Production

The Food Administrator is asking for a large increase in the production of meat and meat products, dairy products, poultry and poultry products, and that this increase be achieved by increasing the number of domestic animals including poultry on our farms. At the same time there is an insufficient supply of animal proteins for the livestock we already have and a prospective shortage of plant proteins.

Since the amount of feed available is limited it would seem the goal of increased production might be attained more easily and more certainly by better care and better feeding of a lesser number of animals, since approximately half of the feed consumed by an animal goes for body maintenance and is wasted so far as a return in human food is concerned. Obviously within limits a given amount of animal feed will produce more human food when fed to fewer not to a greater number of animals.

Many examples may be cited of ways to increase food production without burdening our limited food supply with the maintenance of additional animals, but two will suffice. The Food Administrator asks that 15% more pigs be farrowed than the all-time record number farrowed in 1942. Yet in 1942 and in 1941 and in the preceding years, 30% of the pigs that were farrowed died before weaning time. Much, but by no means all, of this loss is unavoidable. It is very probable that the extra 15% of living pigs necessary to attain this year's goal in pork production could be saved out of this 30% loss, at a tremendous saving in the feed necessary to maintain the sows that would otherwise be required to produce the extra 15% in the number of pigs if we continue, as in the past, to waste nearly 1/3 of our potential pork production.

The poultry industry also furnishes striking examples of waste that may be avoided and saving that may be effected by disease control. But with less effort than disease control entails, a change in marketing habits would attain the goal for increased poultry meat in 1943. The Food Administrator states that 200 million extra meat chickens will be needed during the present year. The poultry industry has shown that this meat goal can be attained by marketing the same number of chickens marketed as last year, at a weight of three pounds and upwards instead of 2½ pounds. That the heavier birds, except perhaps in birds of the Leghorn type, are more profitable to the producer is a further advantage of this method of increasing the production of poultry meat. Increasing the weight rather than the number of birds marketed would mean a saving of some 300 million eggs for incubating and the equivalent of the feed of some two million hens for a year; an important saving when every ton of poultry feed counts. An order prohibiting the marketing of chickens weighing less than three pounds (better 3½ pounds the most profitable weight) would effect a large saving in feed, avoid much over-crowding and make disease control less difficult. It would hurt no one.

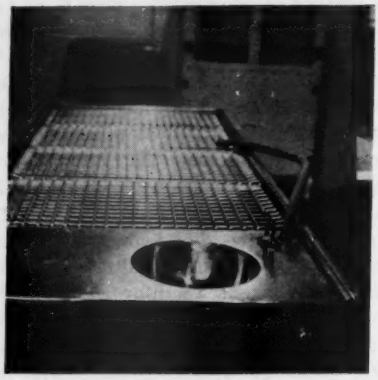
The same principle applies to turkeys. An increased quantity of turkey meat is desired this year. It has been the custom to market young toms at 14 pounds and upwards, although of the common breeds, few are in prime condition at that weight. Setting the minimum weight at 16 pounds, as the army does in its purchases, would increase the production sufficiently to meet requirements and result in meat of a better quality. It would result also in a saving in feed and more profit for the producers.

More swine and more cows and more poultry, in the face of a shortage of feed, may not be the best solution to the need for more food. The whole trend for a generation has been to feed animals better for greater production. The economy, in both feed and effort is well recognized. Now, because of the limited supply of feed available, we are, in effect, asked to reverse this trend and feed them, at best, but inadequately.

★ ★ ★ BUY WAR SAVINGS STAMPS AND BONDS

Massachusetts S. P. C. A. Celebrates 75th Year

In March of this year the Massachusetts Society for the Prevention of Cruelty to Animals celebrated its 75th year of humane work among animals. This organization was established in 1868 by the late George T. Angell. Since 1910 Dr. Francis H. Rowley has ably carried out the responsibilities of this extensive organization, which devolved upon him at the death of Mr. Angell.



A specially constructed autopsy table with hot and cold water piping at Angell Memorial Animal Hospital. For complete elimination of odors, an electric fan in the basement draws the air from the table

It is to Doctor Rowley's efforts and foresight that the well-known Angell Memorial Animal Hospital owes its existence. This hospital is maintained by the S. P. C. A. at 170-184 Longwood Avenue, Boston. Although the hospital wing was not erected until 1914, more than 750,000 animals have been treated there during the intervening years.

A staff of 11 veterinarians, of which Dr. E. C. Schroeder is chief, are in attendance at Angell Memorial Animal Hospital. When constructed, the cost of the hospital was $250,000 and it has improvements and facilities equalling that of the best equipped hospital maintained for human patients. Included are modern diagnostic and X-ray laboratories, improved operating tables and a clinic waiting room arranged so that each of 16 clients, together with his pet, may be seated comfortably in an individual enclosure. The latter arrangement was made to eliminate danger of infections and occasioned much interest at the time. One of the latest improvements has been that of the Macomber Ward* for the treatment of distemper. This ward alone has facilities for 68 patients.

* * * *

Dogs were among the first animals used in experiments to determine the need for vitamin D in the diet. Like calves, poultry and swine, dogs are frequently victims of vitamin D deficiency. It has been determined that on diets commonly fed to these animals, large dogs require a daily supplement of about 270 U. S. P. units of vitamin D per kilogram of body weight, or about 4000 units per pound of food (dry basis) consumed. Good commercial foods are supplemented to this extent by the addition of vitamin D. When dogs are fed on home made mixtures, this probable need for supplementing them with vitamin D should be given consideration.

* * * *

Tribulations of Dog Owners in Britain

In England dog biscuits may be manufactured only from grain damaged by seawater or otherwise rendered unfit for human food and but one-third the tonnage produced in peace time may be manufactured.

There are no ration cards for dogs and heavy penalties are provided for owners who give their dogs any portion of their own food. Only condemned meat may be fed to dogs.

Milk for cats has to be taken from the slender household supply of three pints per week and at the peril of a fine.

Sea fishing is practically impossible off many parts of the coast and the offal from the fish industry and from slaughter houses, which was formerly used in the food of pets is now channeled into war industries or to feed for poultry; none of it being available for pets.

**Vet. Med.*, 37:9, p. 354.

All Slaughterers Must Be Licensed

Orders issued by Secretary of Agriculture Claude R. Wickard March 5, designed to prevent black market operations, require that permits be secured for slaughtering of animals for food and that all livestock slaughterers who sell meat, including farmers and local butchers, are to operate under a slaughter permit system and are required to stamp their permit number at least once on each wholesale cut.

The permit is issued by the U. S. Department of Agriculture war board at county points and by local offices of the department in cities. Where no inspection has been in force numbers are assigned.

All slaughterers operating under federal inspection are required to set aside for war uses designated percentages of their production. Although the percentage of the produce to be set aside was not given by the Secretary, it is understood that the amount will be named by Roy Hendrickson.

The permit order became effective April 1, while the set-aside order went into effect immediately.

Parasitic Diseases of Turkeys

The Office of War Information, Department of Agriculture, suggests that by good management and proper timing of marketing, turkey producers can, to a great extent, prevent the two parasitic diseases that have taken a heavy toll of their flocks—sometimes as high as 75%.

These diseases are hexamitiasis, a severe intestinal infection which is caused by the flagellated organism, *Hexamita meleagridis;* and trichomoniasis, a chronic disease of the lower intestines characterized by the production of lesions in the ceca and liver, which is caused by the protozoa. *Trichomonas gallinarum.*

Since there is no specific drug for either disease and studies have shown that the chief source of infection is from fecal material of carriers. flock owners are advised to market suspected carriers at least two weeks before new poults are to hatch. If breeding stock is kept, there should be a distance of one mile between breeding and brooding units. Fever therapy for trichomoniasis has been tried[1] at Beltsville but is still in the experimental stage.

The Dog News urges kennel owners and other dog owners who can arrange to do so, to raise a few rabbits as a partial solution of the problem of supplying their pets with animal protein.

Big Game Spread Nagana

The Veterinary Department, including Dr. du Toit, of Natal, South Africa, have announced that slaughter of the nagana-carrying game, so abundant there, is the only method to protect cattle on farms bordering the game preserves. Farmers in these sections have been issued ammunition by the government with the understanding that their aim is to restore the balance of Nature by removing the danger of overstocking of big game. It is hoped that the shooting will drive large numbers of the animals back to the reserves and thus minimize the danger to cattle. Small game are less dangerous in spreading nagana.

Pasteurization of All Dairy Products Essential in Control of Brucellosis

Careful pasteurization of all dairy products is an essential safeguard against milk-borne brucellosis (Malta or undulant fever), is pointed out in *The Journal of the American Medical Association* of January 30, in a report on a milk-borne epidemic of the disease in Marcus, Iowa.

From the investigations it also appears that hogs should not be permitted to run in the same lot with dairy cows and that preventing brucellosis in man requires a continuous program of effective measures for the eradication of the disease among farm animals. The epidemic at Marcus, involving 77 persons, was caused by a strain of the organism causing brucellosis which was traced to a raw milk supply. It was found that hogs had been allowed to mingle freely in the same pasture with the dairy cows.

[1] Olsen. M. W., E. A. Allen. 1941. *Vet. Med.*, 1943. 38:3, p. 119.

The Black Market

The black market in meat:

1. Injures hides needed for army shoes.
2. Wastes glands needed for medical supplies in military hospitals throughout the world.
3. Wastes protein needed in animal feed to meet our wartime production goal for food.
4. Brings about an unfair distribution of meat among the civilian population.
5. Develops racketeers (operators) and cheaters (patrons).
6. Distributes uninspected, unsound and unwholesome meat.
7. Violates the law and cannot exist without the support of a large section of the public.

Losses from Hog-Cholera

The annual death rate of hogs from cholera is now less than one-fifth of what it was 20 years ago, and is about one-tenth of the death rate experienced in the devastating outbreaks which occurred during 1886-87, 1895-96 and 1912-13, when the disease was rampant in swine producing areas and effective control measures were not available.

Outbreaks of hog cholera have been reported in recent years from nearly every state but the most extensive losses have occurred where hogs are most numerous. Of approximately 5,800 outbreaks reported to the Bureau of Animal Industry during 1942, 1,421 occured in Iowa, 578 in Illinois, 417 in Ohio, 470 in North Carolina, and 364 in Florida. Smaller numbers were reported from other states, chiefly in the Central West, South, and Pacific Northwest.

Under the Virus-Serum-Toxin Law which the U. S. Department of Agriculture administers, the quality of ani-hog-cholera serum, hog-cholera virus, and other veterinary biological products, is protected by official veterinary supervision of their manufacture. A further aid in the situation is a serum marketing agreement, also administered by the Department, which includes provisions for stabilization of prices and maintenance of reserve supplies for use in emergencies. May 1 of each year each manufacturer must have on hand a supply of serum equivalent to at least 40% of his previous year's sales.

This is a physicist's war just as the first world war was a chemist's war. The job this time is to devise protection against magnetic and acoustic mines, spot airplanes by various physical means, make bigger and better weapons or improvements in older weapons, devise better airplanes that fly faster, farther and carry more bombs. Of course in doing the scientific job in the war, chemistry, and even medicine, biology and psychology, play important roles. New explosives, new methods of keeping soldiers, sailors and airmen healthy, better methods of treating the wounded—all these are important. Medical experts, too, have been mobilized for months, many committees for civilian medical research workers, army, navy and public health surgeons, working together.—*Science*.

Death of Noted British Veterinarian

Prof. J. F. Craig, M.A., F.R.C.V.S., died Jan. 20, 1943, at the age of 64. Professor Craig was born in Glasgow, Scotland, and was graduated from the Royal Veterinary College, London, in 1902. In succession he was professor of Anatomy and Histology (1903-8), Parasitology (1908-19) and Principal (1919-40) in the Royal Veterinary College of Ireland, Dublin. He was Director of Veterinary Studies in the University of Liverpool at the time of his death. He was a member of the Council of the Royal College of Veterinary Surgeons for 22 years and president for a term. He was president of the National Veterinary Medical Association of Great Britain and Ireland in 1934-35 and the recipient of many honors including the John Henry Steele Memorial Medal (1931).

Professor Craig's contributions to the veterinary press of Great Britain were many but it was chiefly by his articles in Hoare's "Veterinary Medicine" and in Wooldridge's "Encyclopedia of Veterinary Medicine and Surgery" that he was known to American veterinarians.

Pentothal Sodium Anesthesia

A Review of the Literature

By H. J. MOSTYN
New York City

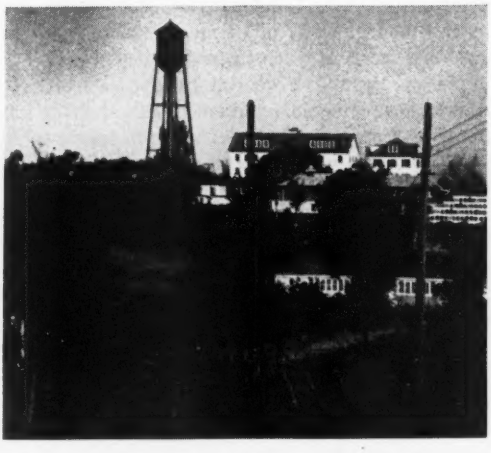
VARIOUS intravenous anesthetic agents were used prior to the introduction of sodium pentothal. The first reported appears to be that of Pirogoff and von Flour, who, in 1847, administered ether in this way. Ore, in 1872 at Lyons, used a solution of choral hydrate. Remarkable results were obtained by the Russian, Federow, who, during the early years of the twentieth century, reported the intravenous use of 0.75% hedonal for anethesia in 530 cases without a death. Subsequently Gwathmey used from 5 to 7.5% ether in Ringer's solution intravenously and later reported having used trichlorisopropl alcohol. Other drugs which have been suggested as intravenous anesthetic agents at various times include chloroform, morphine sulphate, paraldehyde, and avertin.

The barbituric acid compounds were first introduced as intravenous anesthetic agents in 1929 when an attempt was made to utilize sodium amytal. This drug was abandoned because of the lack of proper relaxation, the postoperative restlessness, and the prolonged recovery period. Although pentothal sodium had been developed earlier by Tabern and Volwiler, it was first used clinically by Lundy at the Mayo Clinic in 1934. Since that time he and others have reported its use in 54,851 cases with almost universal praise of its anesthetic properties.

Pentothal sodium, or sodium ethyl (1 methylbutyl) thiobarbiturate, owes its success as an anesthetic agent to the fact that, like evipal, it belongs to the group of so-called "light" or short-acting barbiturates. The "heavy" barbiturates, such as nembutal and sodium amytal, remain unchanged *in vivo* and are excreted as such by the kidneys for as long as 72 hours. For this reason, when they are used as anesthetic agents, there is an undesirable prolongation of the anesthetic effect. Although the method of the destruction of pentothal in the body is not clearly understood, it has been shown that the process occurs so rapidly that scarcely a trace can be found in secretions three to 12 hours after the administration of a single, therapeutic dose and, for all practical purposes, the effects last but three to 30 minutes, depending upon the dosage.

Pharmacologic Action

The pharmacologic action of pentothal sodium has been subjected to close scrutiny by numerous investigators. Its effects upon the circulatory system are minimal, no significant changes having been observed clinically in the pulse volume and rate, the blood pressure, or electrocardiographic tracings. The occasional appearance of conduction changes, as indicated by ectopic beats, has been explained on the basis of a transitory anoxemia, the relief of which causes the resumption of normal rhythm. Cardiac irregularities, already present, have not been effected by sodium pentothal anesthesia.



Laboratory of Mayo Clinic in the background. Here pentothal sodium has been used thousands of times

Pentothal sodium causes a very definite respiratory depression which is clearly demonstrated by a shallowness of breathing without change in the respiratory rate. Clinically, respiration is likely to be almost imperceptible so that methods for evaluating the depth of anesthesia other than observation of the respiration must be relied upon. This depression of respiration is dependent upon the concentration of the drug in the blood at any one time so that large amounts may be given in broken doses over a period of time. Fortunately, the rate of destruction of the drug given in therapeutic doses is so rapid that even though depression of respiration results in momentary arrest, breathing recurs almost before cyanosis appears. Adriani and Rovenstine have shown experimentally that pentothal, as well as other anesthetic agents, produces a constriction of the bronchial musculature, probably through parasympathetic stimulation, which is relieved by atropine.

Reynolds, Schenken, and Veal found areas of focal necrosis in the livers of 10 of 20 mice given comparatively large doses of pentothal sodium. This change was also present after nembutal anesthesia. Other investigators in experiments upon mice, dogs and monkeys have found no liver changes other than the mobilization of glycogen and its temporary replacement by fatty infiltration, a change which occurs in all general anesthesia.

Marshall mentions the administration of sulfanilamide as a contraindication to intravenous pentothal anesthesia. Adriani, in investigations with rats to which sulfanilamide had been given, found that subanesthetic doses of pentothal became anesthetic, and that doses that were anesthetic to untreated animals were usually lethal to the group given sulfanilamide.

Experimental work to determine the minimal lethal dose of pentothal sodium in rabbits and dogs has been shown to be approximately 35mg per kilogram of body weight. One-half of this amount gives satisfactory anesthesia. Other investigators, using rats and cats have estimated the minimal lethal dose to be from 90 to 225gm per kilogram. Gruhzit and his co-workers have stated that the ratio of the maximal tolerated dose to the minimal anesthetic dose is 4.5:1 in rats and 3.8:1 in dogs. The results demonstrate that the drug is destroyed so rapidly that the intermittent method of administration allows one dose to be partly detoxicated before the next is administered. This becomes especially evident when it is considered that induction of anesthesia is usually obtained by the administration of less than 3mg per kilogram of body weight and that subsequent doses are less than 1mg per kilogram of body weight. The total amount of pentothal used in an operation lasting one hour varies between 13 and 26mg per kilogram of body weight.

The effects of pentothal sodium upon the circulatory system are minimal

Clinical Considerations

The introduction of two important improvements in the technic of administration of intravenous anesthetic drugs have made it possible for pentothal sodium to become an effective agent for general anesthesia. The first of these innovations was the development of the intermittent method of administration in which the anesthetic solution is injected as the indication arises. Such a technic permits the maintenance of an even anesthesia and, because of the rapidity of the destruction of the drug, makes sodium pentothal anesthesia as controllable and its use as safe as that of any inhalation anesthetic. The second fundamental improvement in this technic of

administration in the field of human surgery was the wide adoption of the continuous administration of oxygen during anesthesia. It has been shown that the barbiturates as a class affect respiration by decreasing its depth.

The apparatus used for intravenous pentothal administration may be as simple as a sterile syringe and a small-calibre intravenous needle. Various amplifications of these have consisted largely of apparatus for stabilizing the source of supply of the anesthetic solution.

Induction of anesthesia is a matter of a few seconds after the injection is begun. There is no excitement during the second stage, the patient drifting into unconsciousness as if in normal sleep.

Since immediate death of experimental animals after overdosage has been demonstrated to be due to respiratory failure, through paralysis, without the effect of any other pathologic process, it follows logically that the recommended antidotes for pentothal sodium are various respiratory stimulants such as coramine, picrotoxin, alphalobeline, metrazol, oxygen and carbon dioxide. These in many instances have appeared to be specific in the treatment of overdosage. A note of caution in the indiscriminate use of coramine and metrazol was sounded by Maloney, who demonstrated that stimulating doses of coramine and metrazol, administered to barbitalized rabbits, caused transitory arousal at certain dosage levels with death from depression in others; in every instance coramine and metrazol, when combined with barbital, increased the duration of narcosis over that of the controls. Picrotoxin is reported to be the most effective antidote for pentothal. However, with its use there is a dangerous depression of cortical activity which comes on just before the onset of convulsions. A report of the Council on Pharmacy and Chemistry of the American Medical Association states that when the two drugs are given together, there is "a combined form of poisoning by picrotoxin and the barbiturate with a mixture of stimulation and depression, from which within a given range of doses, the animal ultimately recovers."

The ABC of Vitamins

Vitamins are different from most other nutrients because they are needed only in small amounts in the ration. Dried skimmilk, which is an excellent source of vitamin G (riboflavin), contains just about 1/30 ounce of this vitamin per 100 pounds. In the case of vitamin D, the actual amount of the pure vitamin present is very much less than this. Even in 100 pounds of ordinary cod-liver oil, which is a potent source of this vitamin, if every particle of vitamin D were secured, there would be about 1/300 ounce of this vitamin. If one pound of this cod-liver oil were put in 100 pounds of feed the result would be a feed containing just 1/30,000 ounce of pure vitamin D. Essentially, the same story holds with the other vitamins; they are needed in only minute amounts.

The vitamins were originally named from the alphabet for lack of a better method of naming. At first, research workers knew only that certain necessary nutritional factors existed, that if they were not included in the diet, sickness ensued. Gradually, each of the vitamins is being tracked down and studied until now, most of the common vitamins are made synthetically.

For practical poultry feeding, the vitamins to keep an eye on are the "big 3," A, D and G. Vitamin B_1 is so plentiful in any ration containing the usual grains and their by-products that there is little danger of a shortage. One fact which is becoming increasingly clear about some of the vitamins is the fact that they are not necessarily a single chemical substance. In the case of vitamin D, for instance, there are several chemical substances which have vitamin D activity. There was a time when most people thought of vitamin D in terms of cod-liver oil. Today, however, poultrymen are thinking less about cod-liver oil and more about vitamin D from various sources. It is the amount of effective vitamin present that really matters, not the substance which carries it. — Victor Heiman in *Poultry Digest*.

★ ★ ★ BUY WAR SAVINGS STAMPS AND BONDS

Eradication of the Warble Fly

TWO species of warble flies cause a tremendous loss to our cattle industry. The one more generally distributed over the United States is the *Hypoderma lineatum*, commonly called the heel fly, which may be seen during April and May. The other species, *H. Bovis*, so far as is known at present, is limited to the northern and central states. The mature flies of this species are about during June and July.

The loss caused by the warble fly to this

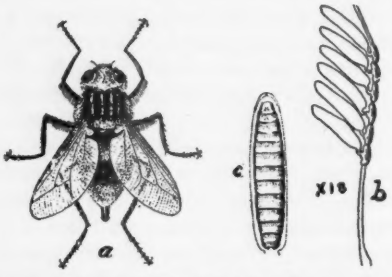


Fig. 1. a, Warble fly (heel fly) *Hypoderma lineatum*, b, eggs of this fly attached to a hair, c, larva before it hatches and begins its travels through the body of the animal

country by decreased milk production, injury due to cattle stampeding when the flies approach, stunted growth of infested cattle and, most serious of all, the damage to hides, has been estimated to be around $100,000,000 annually.

Tabulation by the American Meat Institute of the receipts at one packing plant and its subsidiaries over a 4-year period show that 42% of the hides were grubby. Hides having as many as five grub holes are classed as grade No. 2 and are subject to discount.

H. lineatum lays a row of eggs along a hair of the cattle while *H. Bovis* is satisfied to lay one egg near its base. An egg will hatch in three to six days into a larva about one-twenty-fifth of an inch long, which burrows into the skin at the base of the hair, then it leisurely migrates through the animal's body, spending considerable time in the wall of the gullet and finally reaches its goal, under the skin of the back of the animal, several months after making entrance through the hair follicle. In the

Fig. 2. Fully developed grub under hide of back of animal. (Two thirds natural size.)*

northern latitude this occurs in the late spring and up to the middle of July. If these grubs are allowed to mature, they drop out and burrow into the ground where they remain for about a month, to emerge mature flies.

To prevent the completion of this life cycle and to eradicate the fly, it is advisable to remove the grubs that have developed enough to cause perceptible swellings of the hide of the animal. This can be done mechanically by applying pressure with the hands, by using a suction pump or a pair of very small forceps. The degree of success will depend upon the age of the larva and the thickness of the skin. Of course, grubs removed should be destroyed.

There are several methods of external treatment for destroying the larvae under the skin. Derris powder, which should contain 4% to 5% of rotenone, rubbed thor-

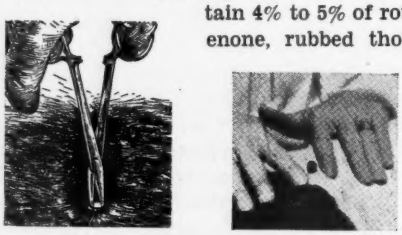


Fig. 3. Left, extracting grubs with forceps; right, forcing grub out by pressing down and inward*

oughly into the skin is effective in destroying the young grubs. A wash composed of 12 ounces of derris powder and four ounces of soap in one gallon of water, applied to the back and sides with a brush or sprinkled slowly along the middle of the back and, as it runs down over the back and sides,

*Courtesy, *Poultry & Livestock Journal.*

scrubbed vigorously, is quite effective. If handled carefully one pint of the mixture is usually enough for one treatment of an average size animal. The derris powder remains on the skin and hair coat for several weeks.

Treatment with the wash before the larvae have become mature grubs, 20 to 30 days after the first grub holes appear in the hide, usually kills 90% to 95% of the larvae. A second treatment, in 30 days, will ordinarily finish up all the grubs harbored by the animal, that is, those of the *H. lineatum* species. Infestations with *H. bovis* usually require three or four treatments, applied 30 to 40 days apart.

In the event that derris powder or cube cannot be obtained, an ointment composed of one part iodoform to five parts petroleum or vaseline, or a powder of nicotine is recommended by the Animal Pathology and Hygiene Department of the University of Illinois. The injection, with an oil can, of benzol or carbon tetrachloride into the grub holes, which kills more than 90% of the larvae is also suggested. These treatments should be repeated at 30-day intervals from the time that the larvae first appear under the skin.

In experiments conducted by the U. S. Bureau of Animal Industry, a commercial hymolosalt was substituted for the soap in the same wash formula given. However, the efficacy of the treatment varied in destructiveness of the larvae from 91% to 97% of infested cattle in Colorado and from 37% to 52% of those in Texas. The same formula (hymolosalt omitted) has been used by the Bureau as a dip and in Colorado about 98% of the grubs of cattle treated were destroyed. The cattle were held in the dip about two minutes.

Where powder is used to combat the grubs,* a mixture of wettable sulfur (325 mesh) with derris powder is easier to apply and rub into the skin and is more effective than the derris powder alone.

For large scale treatment, the easiest, quickest and most economical method is to use a high-pressure, power operated orchard sprayer, controlling the cattle in a chute, and using a combination of five pounds of derris powder (5% rotenone), 10 pounds of wettable sulfur in 100 gallons of water. The operator stands high enough so that he can direct a medium-fine spray with force on each animal's back.

In this way six men can handle and treat around 100 cattle per hour. The spraying method is also more economical in the quantity of material required than the other method mentioned.

Calves and young cattle are more frequently and more severely infested by the warble fly than are older animals—it may be they have not yet learned the danger or to make attempts to ward off the flies.

Treatments do not avoid damage to the hide but the purpose is to exterminate the parasite during the stage when it can be most readily reached, and thus aid in possible eradication of the warble fly. It has been found that animals, on the borders of areas where the warble fly had been practically exterminated, remained 90% infested with the larvae of this fly. This would indicate that the warble fly is not a migratory insect and should encourage efforts to eradicate the warble fly from individual herds.

* * * *

Limitation of Protein in Feeds

Proteins used in poultry and livestock feeds will be conserved through a voluntary cooperative program adopted by representatives of the feed industry, at a meeting with Department of Agriculture officials.

Under the program, the feed industry will hold the protein content of mixed feeds to certain maximum amounts. This action is designed to extend supplies of proteins to meet heavy demand in the drive to reach 1943 livestock, dairy, egg and poultry production goals. It was adopted by the Feed Industry Council.

Maximum protein content of mixed feeds agreed to by the council varies but, in most instances, represents a substantial reduction.—*Nat'l Provisioner.*

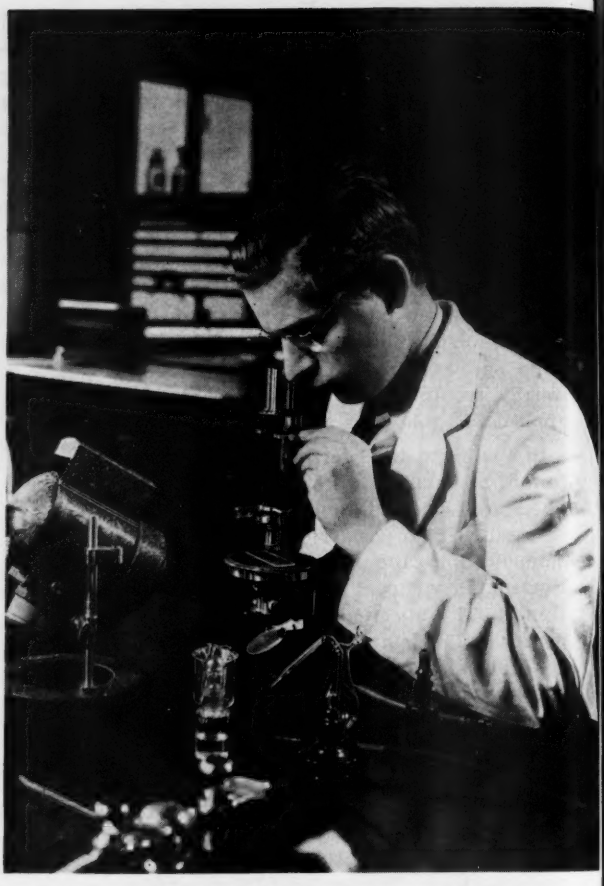
★ ★ ★ BUY WAR SAVINGS STAMPS AND BONDS

*Bureau of Entomology and Plant Quarantine reported in *Keeping Livestock Healthy*, 1942 Yearbook of U. S. Department of Agriculture.

Treatment *of* Mastitis *with* Tyrothricin

By F. E. MARTIN
West Chester, Pa.

Streptococcic mastitis was eradicated from a herd of 49 Guernsey cows by the use of tyrothricin, in conjunction with repeated microscopic examination of milk specimens from the entire herd. The cost of this method of handling mastitis is interesting from the standpoint of both the dairyman and the veterinarian.



Microscopic examination is an essential factor in laboratory diagnosis

Procedure

Sanitary conditions on this farm were somewhat better than the average, but were not ideal. The washing of udders was a little lax, in that only one cloth and one bucket of disinfectant were used on the entire herd. The milking was done by milking machines. The teat cups of the milking machine were rinsed in cold water containing sodium hypochlorite, after each pair of cows were milked.

At the time the study was started, there were no clinical cases of mastitis in the herd, but the owner pointed out five cows that had suffered attacks of mastitis during the past year. It had been the practice of the owner to sell off cows as soon as they showed persistent udder trouble.

Diagnosis—The incubated film technic on individual quarter samples was followed exclusively. Before taking samples, each udder was washed with a sterile cloth wrung out of sodium hypochlorite solution. After discarding the first stream of milk, the sample was drawn into a sterile vial. Vial stoppers were protected from contamination by paper bottle-caps held in place with rubber bands. Each vial contained 0.5cc of equal parts of 0.5% brom-cresol purple and 1 to 500 sodium azide.[1] These vials were inverted after filling and incubated at 37.5° C. (99.5° F.) for 20 to 24 hours. The fermentation reaction was then noted and films were prepared by touching the stopper from an inverted vial to a glass slide. The resulting films were dried, stained with Newman's stain and examined under the oil-immersion lens of the microscope.

At least two positive findings, two weeks

apart, were required before a case was diagnosed positive. Likewise, after treatment at least two consecutive negative tests were required, at bi-weekly intervals, before the case was classed as cured. The entire herd was examined monthly during the period under observation. Affected cows were examined one to three times between monthly examinations.

Therapy—Following complete milking of an infected quarter the udder was washed with a sterile cloth wrung out of hypochlorite solution. The end of the teat was again cleansed with a pledget of sterile cotton dampened with rubbing alcohol. A glass syringe with a blunt canula was used to inject 20 to 50cc of a mineral oil emulsion containing 2mg of tyrothricin* per cubic centimeter (a clean, sterile cannula was used for each quarter treated). The quarters were massaged gently, following the injection, in an effort to distribute the emulsion over the internal surface of the cistern and also over the surface of the sinuses emptying into the cistern.

The milk was discarded at the next regular milking. Subsequent milkings were used to feed calves until the milk returned to normal in appearance, which was usually on the third to the sixth day following treatment. By treating only enough cows at a time to furnish the milk required by the calves, very little disturbance occurred in the output of market milk. A week later, individual quarter samples were again examined and treatment was repeated on such as were positive. In refractory cases, the weekly examinations and treatments were continued into the dry period, resulting in cures of some apparently hopeless cases.

*The emulsion of tyrothricin was furnished gratuitously by the Pitman-Moore Co., Indianapolis, Ind., for investigational use.

Results

Streptococci were recovered from the milk of 12 cows in this herd of 49; a total of 30 quarters being infected. As indicated in Table I, nine of these cows became negative to this organism following 1 to 9 injections of emulsion of tyrothricin, in doses ranging from 20 to 50cc. Recoveries followed an average of 2.6 injections. Two cases failed to respond to a total of six (A4—2 quarters) and three (B1—4 quarters) injections respectively and were dismissed as incurable. One cow (A17) was sold without being treated (Table I).

TABLE I—RESULTS OF TREATMENT WITH EMULSION OF TYROTHRICIN OF STREPTOCOCCIC MASTITIS DIAGNOSED BY MICROSCOPIC EXAMINATION

Cow	Infected Quarters	Treatments per Quarter	Dosage per Quarter cc	Quarters Cured	Lab. Exams. per Quarter
A4 (d)	4	2	25	2	16
C3 (d)	2	1	25	2	5
C4 (d)	1	1	25	1	10
A4*	2	6	20-50	0	16
A16	2	3, 2	25-50	2	14
B1	4	3	20-50	0	9
B2	3	3, 2, 1	20	3	12
B3	2	6, 2	20-50	2	22
B5	2	1	20	2	9
B12	3	1, 1, 3	20-40	3	12
C5	1	4	20-50	1	13
C10	2	7, 9	20-50	2	18
A17**	4	0	....	0	4

(d) Dry cows, others lactating.
*This case was treated first as a dry cow and later after she had freshened.
**This cow was sold without treatment.

The cost of this procedure to the dairyman has been estimated on the basis of the usual veterinary fees for examining and treating the herd over a six-month period. These charges are itemized in Table II. Since 9 of 12 infected cows were cured, the cost for this service was $20.43 per cow that recovered. As to the non-infected group, the cost for vigilant observation over the entire period was $1.04 per cow per month (Table II).

Discussion

The full fruition of an experiment of this nature will require several years. However, the results so far attained would seem to justify the cost of the experiment. It is

estimated that the cost per cow of maintaining a herd free of streptococcic mastitis is approximately $4.50 per year, per cow—estimating ten laboratory examinations at $0.30 each and 1½ treatments at $1.00 each.

The reports of Jones,[2] Hardenbergh and Schlotthauer,[3] Minet, Stableforth and Edwards[4] and many others, all associate the great bulk of udder losses with streptococcic infection. The results of this practical study

TABLE II—ESTIMATED COST TO DAIRYMAN FOR ERADICATING STREPTOCOCCIC MASTITIS

Cows	Item	$
Infected 12 cows (30 quarters)	343 laboratory examinations @ $0.30	$102.90
	81 intramammary injections of emulsion of tyrothricin @ $1.00	81.00
	Cost per cow, per month = $2.55 Cost of complete cure, per cow recovered = $20.43	
	Total	183.90
Non-infected 37 cows	768 laboratory examinations @ $0.30	230.40
	Cost per cow, per month = $1.04	
Total cost six months' observation and treament		414.30

together with those previously published by the author[5,6] tend to show that a comparatively simple laboratory examination, if repeated often enough, will eventually locate all the infected quarters. With this information an intensive campaign of treatment can be instituted with the udder antiseptics now on the market. Treatment alone, however, will not suffice. Cows that prove refractory to treatment must be eliminated from the herd because treated cows are highly susceptible to re-infection. Stable floors must be cleaned and disinfected after removal of infected cows. It is the old story of keeping the susceptible animal away from the source of infection.

During the course of this study it became necessary to take a set of samples shortly after the morning milking. In these samples from strippings, two infected quarters, that had not shown up in the previous routine examinations of fore-milk, were detected. A subsequent check of these two cases showed many more bacteria in the samples from strippings than from the fore-milk. Steck[7] reported this condition in about 1% of the cases that he studied. It is now my practice to take an occasional set of samples in the morning shortly after milking. This as routine practice will help the practitioner in that the work of taking samples can be distributed over a longer portion of the day.

As streptococcic mastitis is known to spread very slowly,[7,8] no effort was made to separate infected cows until treatment had been tried on all that were to be treated. When it became apparent that certain cows were not responding to treatment their segregation or elimination was strongly advised.

Summary and Conclusions

In a herd of 49 cows, 12 were found to be shedding long-chain streptococci from 30 quarters. Diagnosis was made by microscopic examination of films of incubated milk from individual quarters. Treatment consisted of instilling an emulsion of tyrothricin in mineral oil into the infected quarters and repeating as indicated by the results of reëxaminations.

Of the 11 cows treated nine (82%) were cured; of the 26 quarters, 20 (77%) were cured. Two cases were dismissed as incurable. The number of treatments required varied from 1 to 9 (average 2.6), in doses ranging from 20 to 50cc.

The total cost to the dairyman for veterinary services was estimated in this study at $414.30, or $20.43 per cow in the infected group, and, for the monthly examination, $1.04 per month per cow in the non-infected group. It is further estimated that under field conditions this course of examination and treatment can be placed on a routine practical basis at a figure approximating $4.50 per cow per year to maintain a herd free of streptococcic mastitis after it is once cleaned up.

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Results of vaccination with *Brucella abortus* strain 19, to prevent brucellosis in cattle has shown the treatment to be effective in a great majority of the cases, according to a report just released by the U. S. Department of Agriculture.

The report had reference to animals vaccinated as calves which were kept under observation; exposed to the disease through mingling with infected animals. In this study of 21,000 animals over a period of six years, approximately 96.9% of the calvings of the vaccinated cattle were normal—evidence of brucellosis infection being found in only 1.1%.

Infertility in Cattle

It seems of interest to inform veterinary surgeons in Great Britain that vitamin C (ascorbic acid) is being used very extensively in the U.S.A., especially in the north middle-west dairying states. The manufacturers of veterinary supplies make a special feature of this in their catalogues and magazines. This is not mere business enterprise, but is sound advice based on research work by many of the agricultural experiment stations. Here, regrettably, we see instead numerous and large advertisements for synthetic sex hormones.

It is too little appreciated here what an immense amount of veterinary research is done at the American agricultural experiment stations. If fresh research facilities are to be made available, let them be used directly for *ad hoc* research into the effect of sex hormones in *ordinary farm cattle* (not rats or other animals): in other words, note the results of an experiment which was recently carried out at the Cornell University agricultural experiment station. They borrowed slow-breeder cows from local farmers, kept them quiet and on moderate diet, treated some with anterior pituitary hormone, others with oestradiol benzoate and kept several as controls. Within six months a greater proportion of the controls had conceived than of the treated animals. The reporter concludes that hormone therapy is contraindicated in such cases.

Modern hectic times furnish many examples in many walks of life of attempts to get quick results—followed by disaster. Attempts to increase and speed up the calf crop can easily come into the same category and the stress of war militates to the same end. The spurring of a tired horse comes to mind in analogy. We veterinarians, of all people, are now claiming it as our sphere to care for the health of the country's livestock, and in doing this we should obviously take the long view and not allow any treatment of animals calculated to get quick results at the expense of health and long life. We ought to know that Nature cannot be hurried with impunity!

While admitting that cattle can do on poorer winter roughage than sheep, the average shepherd will tell you that his sheep will eat many weeds that cattle refuse and can be maintained on pastures almost totally unsuited for beef production. Sheep are naturally better scavengers, doing particularly well on stubble fields and can be run on land too wet for larger animals.—Report *Kansas State Board of Agriculture.*

When sufficient vitamin A was added to the feed of 86 calves receiving skim milk with milk-fat substitute, calf pneumonia was reduced from 46.2 to 20% and death losses from 75% of the calves affected to 7%, is announced by the Ohio Exp. Sta.

To prevent pneumonia 15,000 to 20,000 units of vitamin A were fed daily. However, vitamin A treatment is not effective in controlling calf pneumonia due to poor housing or exposure but only when the disease is a result of deficient diet.

Excerpts from letters of J. Edwards, West Byfleet, England, in *Veterinary Record*, Nov. 21 and Dec. 19, 1942.

Pseudorabies (Aujeszky's Disease) *in* Suckling Pigs in the United States

By J. D. RAY* Omaha, Nebraska

IN May, 1940, Dr. R. L. Cundall, Fairfax, Missouri, brought three pigs about two weeks of age to the laboratory for diagnosis. The history of the drove from which these animals came indicated that a few weeks previously pigs had shown similar symptoms with some loss at that time. However, the owner had not considered the trouble of sufficient importance to call a veterinarian. Later the disease appeared in the younger pigs which were one to two weeks of age. Nothing was done to combat the trouble until the loss had been considerable. Originally there were 190 of the small pigs and losses resulted until only 106 were left when Doctor Cundall was called to handle the problem. A number of the animals were affected at the time, showing symptoms of involvement of the central nervous system. No other type of disease was noted at the time. The three pigs brought in for diagnosis were held for observation. The largest pig of the group was less severely affected, showing incoordination and excitability. This animal improved gradually and appeared normal in a few days. The other two were more involved. A progressive paralysis, with more or less excitability, developed and finally prostration and death. Cultures from various tissues proved negative.

The brain was removed from one of the latter animals immediately after death. Cultures were made and sections from various parts of the brain were macerated in saline solution. A portion of this brain suspension were injected subcutaneously into rabbits and intracerebrally into mice. No growth developed in cultures. However, on the third day the rabbits became nervous. Soon thereafter they began to lick at the point of injection. Later they would be seized by convulsion-like movements and at the same time would gnaw ravenously at the site of the infection. They became progressively worse and died on the fourth day. By the time death occurred the lesion had been gnawed free of hair, the skin was conjested, lacerated and bleeding. The mice began to show nervous symptoms on the third and fourth day. Some would scratch at the point of inoculation on the head, others would jump as if startled, while others developed paralytic symptoms only. All of these became progressively worse and died.

The brains from the mice were removed and more mice and rabbits were inoculated from these brains in the manner described when the pig brain was used. Likewise, rabbit brain material was used as inoculum for mice and rabbits. In each case the results were similar to those obtained when pig brain material was injected. A diag-

*Director, Laboratory of Biological Production and Diagnosis, Corn States Serum Company.

nosis of pseudorabies or "mad itch" virus infection was made.

Having established the disease in experimental animals, both rabbit and mouse brain material has been maintained by refrigeration and repeated animal passage, for further study.

The action of this swine strain of pseudorabies virus in experimental animals seems to be identical with the few bovine strains isolated by the writer from clinical cases of pseudorabies (mad itch) in cattle.

Evidence of pseudorabies virus infection in swine in the middle western states has been reported by Dr. Richard E. Shope[1]. However, it has not been recognized as a clinical problem by veterinarians in that territory. In Hungary, before the present war, Koves & Hirt[2] described pseudorabies (Aujeszky's disease) in swine as a major problem in that country. Koves[3] indicates that the mortality in suckling pigs may be high in certain droves. However, the losses in older animals rarely exceed 5%, even though the morbidity may reach 100%. Practically all fatal cases are in animals that develop nervous symptoms and suckling pigs are quite prone to do this.

According to Koves & Hirt, symptoms vary in swine. The usual type of infection is ushered in with a fever up to 106°F. Animals become weak, the appetite is impaired, and vomiting is common. Only a few cases may appear at first and these recover in one or two days. Soon, however, the disease spreads to most of the drove. As the course of the disease progresses, lung involvement becomes apparent in some individuals and diarrhea is common. A small percentage of affected individuals may develop nervous symptoms. They become restless, some tremble, others show exaggerated contractions of groups of muscles and when the pigs become exhausted they remain quiet for a short time, after which they become aroused and continue their movements. These nervous manifestations become more pronounced as time passes and complete loss of control of parts may result after a few hours. Frequently, salivation develops due to paralysis of the pharynx. Certain individuals may show evidence of extreme pain, make pitiful sounds, jump suddenly as if excited, push against the wall of the pen or continually try to climb the wall. Such cases become exhausted and die in a few hours. Itching, biting and scratching of the infected spot does not occur in swine.

Koves & Hirt also indicate that the lesions are not pathognomonic. Secondary lesions in the throat may result if partial paralysis of the pharynx develops. Pulmonary edema is common. Gastritis may be found. Intestinal lesions are more apt to be plentiful. Conjestion of the blood vessels and frequently hemorrhagic infarcts may be found in the wall of the small intestine. In such cases the intestinal contents is fluid and of a chocolate color. Exudate may collect in the lumen of the bowel and coagulate on the surface. The picture in the large intestine, however, is different. Infarcts do not appear but the mucous membrane takes on a reddish color, especially in patches. Exudation may develop over these spots, resulting in croupous stratification. Severe complications are more apt to develop in fattening hogs during the winter.

None of the lesions listed above and only a few of the symptoms enumerated were observed in the three pigs studied by the writer. For that reason the reporting of this case has been delayed with the hope that other cases would be encountered and more clinical manifestations could be studied and recorded. However, none have been recognized. We hope that this report will stimulate others to watch for this infection and help determine the importance of the disease in swine in this country.

[1] Shope, R. E., 1935. *Jnl. Exp. Med.*, 62:201, p. 101.
[2] Koves, J., and G. Hirt, *Arch. Tierbeilk*, 1934.
[3] Doves, J., 1935. Office International Des Epizooties, R. 59.

Things Practitioners Can Do for Poultrymen*

By H. J. STAFSETH**
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ESTABLISHING a poultry practice seems to be somewhat of a problem to many veterinarians who are primarily interested in the diseases of mammals. Some say they are too busy with mammalian practice to pay any attention to poultry. Others claim ignorance of, or lack of interest in, poultry diseases as a reason for non-participation in this important phase of veterinary service.

Lack of Time

Lack of time may, in the case of some overworked practitioners, constitute a valid reason for neglecting the wants of poultrymen, although better planning of work might make it possible to render a considerable amount of a much needed service.

Ignorance of Poultry Diseases

Ignorance of poultry pathology and hygiene is no excuse for avoiding poultry practice nowadays. All veterinary colleges offer undergraduate courses, and many veterinary institutions give post-graduate courses in this field, at least once a year. Furthermore, the literature on this subject is abundant and readily available.

Duty and Lack of Interest

For the past 20 years every veterinarian who has graduated from an American veterinary college has been educated, largely at public expense. The rather substantial contributions which the Federal and State governments make toward the support of veterinary education and research come from people of all walks of life, including poultrymen. Veterinary colleges and research institutions are maintained for the purpose of safeguarding our live stock industry, of which our poultry industry is a part, valued at over one billion dollars. Also, through food inspection and control and eradication of live stock diseases communicable to man, veterinarians can contribute much more than is generally realized toward a high standard of public health. In view of these facts, is a veterinary practitioner, located in a community in which poultry husbandry is of some consequence, justified in neglecting poultry practice merely because of lack of interest? Hardly so. On the other hand, it seems to me that it is the duty of a veterinarian, educated at public expense, to do his very best to help poultrymen as well as other livestock growers if it is at all possible. Negligence in this field opens the door widely to the ever-present quack.

The annual mortality of adult birds is approximately 150,000,000; but that is not all, for to this tremendous loss must be added that resultant from the consequent decreased egg production as well as that occasioned by the high mortality of chicks and growing stock. This high toll to the poultry industry, due to disease, indicates how much this industry has need of competent veterinary service; for much of this loss could be prevented by known and effective disease preventing procedures. It is the duty of the veterinary profession to deal with poultry diseases as effectively as it has dealt with the many diseases of mammals, such as bovine tuberculosis, Texas fever, glanders, etc. Having (through taxes) invested in publicly supported veterinary education, poultrymen are entitled to something for their money.

What Can Practitioners Do for Poultrymen?

Because of the large numbers involved and the low value of individuals, poultry practice must of necessity be conducted in a manner somewhat different from that employed in work with mammals. In localities where there are large poultry concerns of one sort or another, it seems to me that work on an annual contract basis may be the most satisfactory plan. Under such an

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arrangement the veterinarian may agree to inspect the flock and the premises a given number of times per year, for which he will receive a remuneration agreed upon at the time of making the contract. This contract should cover such items as vaccination against fowl pox, testing for pullorum disease, treating for worms, etc. Furthermore, equitable provisions must be made for special service caused by emergencies or outbreaks of diseases not usually encountered. The cost of drugs and biological products should be defrayed by the poultryman, since it is obviously impossible to predict the amount needed from year to year.

Where a contract system does not seem suitable, the practitioner will have to use his ingenuity to see that poultrymen in his territory receive satisfactory veterinary service.

As I see it, the function of a veterinarian working with poultry diseases should not be primarily to treat individual birds. Such a procedure, if sufficiently remunerative to the otherwise busy practitioner, will be entirely too expensive for the majority of poultrymen. The function of the veterinarian should be: (1) To make accurate diagnoses and to advise as to preventive and control measures, (2) to instruct poultrymen in first-aid and nursing, i. e., to teach them to do everything which they can do satisfactorily and (3) to perform such technical duties as only those professionally trained can do well. Vaccination with live virus vaccines should be done by veterinarians or under their supervision. Pullorum testing for official accreditation has to be performed by professionally qualified persons. Preliminary plate tests for pullorum disease should be, at least, closely supervised.

Importance of Familiarity with Poultry Husbandry

In all his work with poultry, the veterinarian must remember one very important psychological factor which will either contribute to or detract from his success, namely, the way he goes about handling chickens. If he enters a poultry house, picks up chickens and makes post-mortem examinations in such a way as to appear to be a novice with little or no poultry experience, the poultryman is apt to lose confidence and may fail to accept even the best of diagnoses. On the other hand, if the veterinarian seems perfectly at home in a

Fig. 1. If a veterinarian handles a necropsy expertly he will gain the confidence of poultrymen

poultry environment, handling chickens expertly under all circumstances, and talks the poultryman's language, confidence is instilled, his diagnoses are accepted, his recommendations will usually be carried out and his success is assured.

Diagnostic Work of First Importance

Judging from my experience with some practitioners, I fear that the importance of a diagnosis is not fully realized. It is not uncommon to hear such statements as this: "I don't do a great deal with poultry. If people ask me about chickens, I tell them that they can bring some sick ones to my office, and I will examine them when I have time. I don't charge them for the examination unless I sell them some medicine." Such statements are made in complete ignorance or disregard of the ideal relationship which ought to exist between the veterinary profession and the poultry industry. After all, remedies can be bought without going to a professional man, and it requires no skill to give pills to chickens or to put something in the feed or drinking water without knowing the nature of the disease or the action of the drug. Such practices are far too prevalent. Experience and skill in diagnostic work require long and careful

training. Then, why just give it away? Do physicians or lawyers give away professional information? To do so is to give a false impression of the relative value of things. The veterinarian who charges little or nothing for a diagnosis but charges only when remedies are sold, and perhaps wastes his time performing simple work that might just as well be done by the husbandman, is doing little to promote the welfare of his own profession or that of his clients. By doing so he lowers himself to the level of the common serviceman, representing nostrum manufacturing concerns, who has nothing to sell but his questionable products.

Fig. 2. Testicles removed from adult bird reacting to the agglutination test for pullorum disease. Left, testicle from which *S. pullorum* was isolated. Right, normal testicle—no seeming infection

There is a great need of education toward a true appreciation of the value of reliable diagnostic work and of the difficulties involved in it. Since different diseases require more or less specific treatment, it should be obvious that, without first having established the identity of a disease, one cannot intelligently prescribe treatment or effective preventive measures. The fact that a given disease may manifest itself in many different ways and that a number of ailments may show similar symptoms and lesions, is in great need of emphasis. If poultrymen could be made to realize this perhaps they could be made to appreciate how silly it is to believe that persons who have "graduated" from the short courses of certain "quack-mills," which I could name, know more about poultry diseases than graduates of modern veterinary colleges, who now spend five years or longer in college to obtain their education.

It seems unnecessary to go into much detail as to suggestions of a practical nature concerning work with some of the specific diseases. All of you can read, and up-to-date information on the various poultry diseases is not too difficult to obtain. However, I shall discuss a few things which I have found useful in my 20 years of experience in the field of poultry pathology and poultry husbandry.

Pullorum Disease

In connection with pullorum disease control and eradication, it is of the utmost importance to emphasize the fact that testing alone, without applying a number of other sanitary measures, is doomed to failure. Here are some of the measures that must be instituted if we are to succeed at least reasonably well:

1. The incubators must be kept as sanitary as is practically possible. Custom hatching of eggs from flocks that have not been tested or are not known to be free from pullorum disease for other reasons, must never be done in incubators used for eggs from tested or otherwise clean stock. If a hatchery operator feels that he has to do custom hatching for poultrymen whose flocks have not been tested, he must do it in separate incubators and preferably in separate rooms.

2. When chicks are taken out of the incubators they should be handled under as sanitary conditions as are practicable. At this time, when they are shipped or when they are placed in brooders, they should be inspected carefully for evidence of disease, and any not appearing perfectly healthy must be promptly removed.

3. During the first week of brooding the chicks should be inspected at least twice a day and during the next two weeks at least once a day, for the purpose of detecting

illness as soon as possible. Any chicks showing pasted vents, pasted eyes, difficult breathing, tendency to crowd, cyanosis, drooping wings or any other disease symptoms should be removed without hesitation, not only for the purpose of preventing the spread of pullorum or other contagious diseases, but in order to prevent the forming of cannibalistic habits which so often result from permitting healthy chicks or older birds to pick on sick or dead ones.

4. Keeping the brooder house and the utensils as sanitary as possible is obviously very important. Care should be taken to guard feed and water as much as possible against contamination with fecal matter.

5. Breeding stock must be kept in highly sanitary quarters. The floors must be so constructed that they can be cleaned and disinfected easily. This means that dirt floors and even wooden ones are out for the duration. A deep layer of dry litter should be kept on the floors, and should be changed when dampness or excessive accumulation of droppings demands that this be done. Under no circumstances should the birds have access to the droppings on the dropping boards. Most people seem to know this, yet few indeed take pains to prevent it. There are few places where a piece of chicken wire will do more good than between the perches and contaminated dropping boards.

6. A breeder who trapnests his birds should observe their egglaying cycles. To do so may help him to detect gross irregularities which may be indications of disease, perhaps of diseased ovaries. For example, birds affected with pullorum disease may go out of production gradually, missing a day or more with increasing intervals, yet persisting in making one or more appearances on the nests per day. Such an exhibition calls for an agglutination test if not a postmortem examination.

It is important to realize that a single bird with an open case of pullorum disease may do incalculable damage especially if the strain of *Salmonella pullorum* concerned is a highly virulent one.

In making a diagnosis of pullorum disease on the basis of lesions it is well to remember

Fig. 3. A modern poultry farm with ample range facilities for young birds isolated from the laying quarters which house the adult hens. Cohabitation between young and old stock is avoided

that shrunken, irregular and discolored ova may result from conditions other than pullorum disease. Therefore, it may be well to support the diagnosis based on gross pathology with an agglutination test or, still better, a bacteriological examination.

Every veterinarian, who has a worthwhile poultry practice, should always carry some high-grade whole blood, plate test pullorum antigen. Should there be those among you who would be in a position to do some of your own bacteriological work, I would advise you to read an article by Dr. C. W. Darby, published in the *M. S. C. Veterinarian*, Vol. II, No. 4, p. 121, Summer, 1942.

Tuberculosis

In many localities in the midwest we have far more tuberculosis than we should have. We must take this situation more seriously than we do. First of all, I think that practicing veterinarians should have microscopes with oil immersion objectives and staining materials, so as to be able to make their own microscopic diagnoses of tuberculosis and forms of leucosis in which there are marked changes in the blood picture. The gross lesions of tuberculosis and those of certain leucotic conditions are often rather similar. A microscopic examination for acid fast organisms is the simplest way to tell such lesions apart, especially when they are too small and undeveloped for a gross differentiation on the basis of structure. A practitioner would gain much in prestige if he could make his own laboratory examinations for some of the commoner live stock diseases.

Keeping chickens for only one laying period is often recommended as a means of controlling tuberculosis. This is all right as far as those birds are concerned which are kept solely for eggs or meat. When it comes to breeding stock we must remember that breeding from pullets may serve to decrease

Fig. 4. Tuberculin Injection.—*Photo courtesy of Tuberculosis Eradication Division, B.A.I.*

the prevalence of tuberculosis, but may equally well contribute to an increase in the leucosis complex.

In attempting to eliminate tuberculosis from a flock of valuable breeding stock, I should first insist that the flock be confined in fairly small units in a sanitary poultry house. By a sanitary poultry house I mean one that has a smooth and easily cleaned concrete floor, one that is well lighted and ventilated and has screened dropping boards. Feeding and drinking utensils must be so constructed as to prevent fecal contamination of the feed and water. Under no circumstances should the birds be allowed to run on contaminated ground. Concrete or hardware cloth porches may be used if the birds are to be allowed to go outdoors. Litter and droppings, removed from the house, must be burned or placed in screened manure pits. Hauling such material far away from the house and spreading it thinly on the ground during sunny weather may be safe, but burning is preferable under most circumstances. The caretakers must be thoroughly instructed as to

Fig. 5. Tuberculosis tracheitis of a naturally infected chicken. The larynx has been opened to show the lesions on the mucosa

how to prevent the carrying of contamination into the poultry house on their footwear, feeding pails or any other objects.

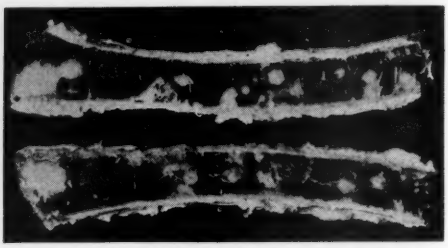


Fig. 6. Numerous tuberculous nodules in the myeloid tissue of the femur of a naturally infected chicken

Screening the house against flies may be necessary.

Having established the above sanitary conditions I would cull the flock carefully to eliminate all birds which show any signs of not being in the very best of condition.

Next I would apply the tuberculin test and remove all positive reactors and all suspects just as soon as they are discovered. Culling should be a more or less continuous procedure, and the tuberculin test should be repeated at not more than two-month intervals. It seems unnecessary to test oftener than once in each six weeks. In view of the work of Dr. Harold E. Moses of the Mayo Foundation, Rochester, Minnesota, the rapid agglutination test worked out by him for the diagnosis of avian tuberculosis, may prove to be a highly useful test in a program such as this, since it will detect infected birds which fail to react to the tuberculin test. Following the tests and the removal of reactors, the house and

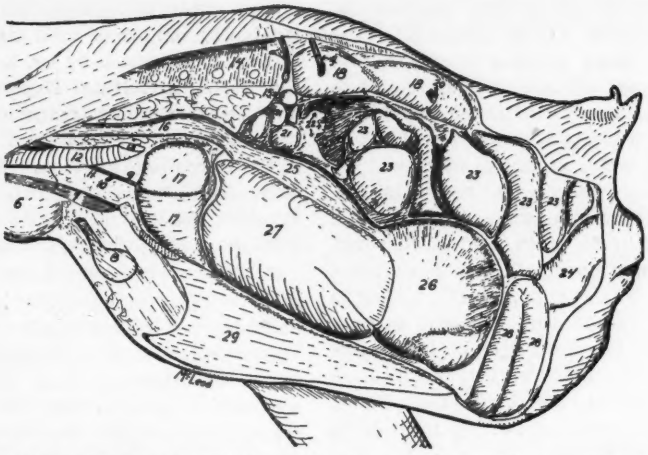


Fig. 7. Viscera of the female chicken, lateral view. 6. Crop. 7. Sternotracheal muscle. 8. Hypocleidium. 9. Brachiocephalic artery. 10. Brachial artery. 11. Carotid artery. 12. Syrinx. 13. Bronchus. 14. Ventral spine —thoracic vertebrae. 15. Thoracoabdominal diaphragm. 16. Esophagus. 17. Heart. 18. Kidney. 19. 7th rib. 20. Ischiatic artery and nerve. 21. Ovarian follicle. 22. Infundibulum. 23. Oviduct. 24. Colo-rectum. 25. Glandular stomach. 26. Muscular stomach. 27. Liver. 28. Duodenum. 29. Keel of sternum

utensils must be cleaned and disinfected.

Blackhead

In Minnesota, where Doctor Billings holds forth, there is no need to discuss the merits of the rotation system of range sanitation for the control of blackhead. We all agree that prevention is preferable to cure. However, man is imperfect and, therefore, it is only natural to expect that our various plans and procedures may, on some occasions, fall short of perfection. Thus we not infrequently find that turkeys contract blackhead even under conditions that appear to be sanitary. Now the question is, what can be done in the line of treatment for blackhead? Nearly 20 years ago Dr. E. E. Tyzzer of Harvard University favored me with a long letter in which he told me of some of his experiences with blackhead. Among other things, he wrote that turkeys had been observed to recover from blackhead if they were confined so as to prevent them from engaging in any kind of exhausting exercise and if they were given a ration fairly rich in animal protein. This was not difficult for the birds were placed on clean ground in inclosures similar to those employed in the rotation system of range sanitation, or, when dealing with very small flocks, we have sometimes put them in houses or shelters provided with porches made of hardware cloth. Getting the sick turkeys to eat was another problem. Many of the diseased birds had lost their appetites to the extent that they would neither eat nor drink. Having observed that chickens and turkeys usually showed increased appetite following the administration of iodine vermicide (Merck), as recommended for intestinal worms, we decided to try this remedy as an appetizer. It worked beyond our fondest expectations. Whether the iodine vermicide has any effect besides that of restoring appetite we do not know, but the combination iodine-rest-and-feed treatment has given us a greater degree of satisfaction than anything else we have tried to do with poultry in the line of medication.

Full grown turkeys receive 1.5 to 2 ounces of iodine vermicide (Merck) diluted as in the treatment for worm infestation, administered directly into the gizzard through a long catheter. There are several sizes of catheters designed for treatment of birds of different sizes. The dose ranges from 0.5 to 2 ounces and is measured by a rubber bulb attached to the catheter. Birds, too small for individual dosing, can be given the drug in milk or in a moist mash if they will eat or drink. The amount of iodine vermicide to put into the milk or mash may

vary from about one to five teaspoonfuls per day for each 100 to 125 poults, the larger doses being given during the first day or two, then decreasing the amount to one teaspoonful and continuing this treatment for at least two weeks. Vermicide in the drinking water is almost useless.

In most cases one dose of the vermicide, given directly into the gizzard, will restore the appetite in 24 to 48 hours, otherwise, the dosing may be repeated once or twice at about 48-hour intervals. Birds, failing to respond to three treatments, are to be considered poor risks and might better be isolated and left to their own fate or killed.

The feed should consist of a high grade, well balanced mash containing from 10 to 15% of powdered milk.

While this treatment has been very effective in restoring large numbers of extremely sick looking turkeys to good health, it is of little or no value if the birds are left where they are forced to ingest large numbers of the blackhead organisms.

Medication for Other Diseases

While too little is known about the cholera-like disease known as pullet disease or blue comb, I feel that a system of medication such as that suggested by Dr. E. S. Weisner, Extension Poultry Pathologist, Michigan State College, is worthy of continued trial. This method of treatment was described in an article by Dr. J. F. Ryff and myself in VETERINARY MEDICINE, Vol. XXXVII, No. 7, July, 1942.

My thoughts on the control of intestinal parasites of poultry, based on many years of experience and a considerable amount of experimental work, have been set forth in the following publications:

1. On the Control of Tapeworm Infestation in Chickens with Notes on the Pathology of the Intestines of the Hosts. H. J. Stafseth. *Technical Bulletin* No. 148, December, 1935, Agricultural Experiment Station, Michigan State, College, East Lansing, Michigan.

2. A System of Control and Prevention of Intestinal Parasites of Poultry (Ascaridia and Tapeworms). H. J. Stafseth, Michigan Agricultural Experiment Station, *Quarterly Bulletin*, Vol. 18, No. 1, August, 1935.

3. Tapeworm Infestation on Poultry. H. J. Stafseth, VETERINARY MEDICINE, Vol. XXXIV, No. 12, August, 1935.

Sinusitis in turkeys has been successfully treated by the use of a 4% solution of silver nitrate as suggested by Dr. E. E. Madsen of the Utah Agricultural Experiment Station and by a similar treatment using 15% argyrol as suggested by Dr. E. M. Dickinson of the Oregon Agricultural Experiment Station. (See Diseases of Turkeys by W. R. Hinshaw, *Bulletin* 613, Agricultural Experiment Station, Berkeley, California.)

Dr. P. P. Levine, New York State Veterinary College, has found that sulfaguanidine has a marked inhibitive effect on the development of coccidia of chickens when given in 2% quantities in mash before infection has taken place. This inhibitive effect ceases as soon as the drug is withheld. The growth of the chicks, while on this treatment, is inhibited to some extent. If it were possible to start this treatment at the right moment it might tide the chicks over until proper sanitary conditions could be established.

In the November-December, 1942, number of the *Veterinary Bulletin Lederle*, Dr. J. P. Delaplane of the Rhode Island Agricultural Experiment Station has outlined a rather elaborate system of control of simple infectious coryza (*Hemophilus gallinarum*) in chickens. I question whether some of this system is practical for field application, but sulfathiazole does have some merit in combating *H. gallinarum* infection. However, it is important to remember that other forms of coryza (roup) are not favorably affected by the use of this drug.

The value of vaccination against fowl pox and laryngotracheitis is too well known to warrant a discusison here.

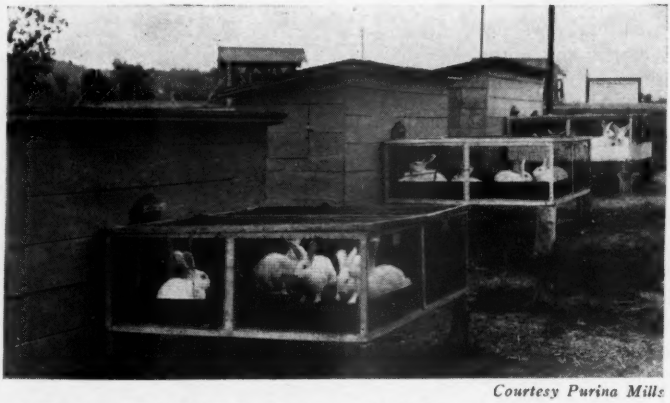
Finally, while treatment of certain poultry diseases may be more or less effective, a veterinarian can make himself most useful to the poultry industry by serving as a readily available diagnostician and counsellor. Intelligent advice regarding control of disease must take into account the conditions which prevail on the premises. In this respect the local practitioner has a marked advantage over the laboratory man. Take this advantage and use it. If necessary seek the aid of the nearest diagnostic laboratory.

Problems of Backyard Rabbitries*

By R. F. GORDON
Weybridge, England

THERE is almost a complete lack of reliable information on rabbit pathology, and it is difficult to assess the incidence of the various diseases or their relative importance. The diseases briefly described are selected from our post-mortem records and their importance stressed according to the frequency with which we have encountered them.

Undoubtedly the commonest disease is coccidiosis, of which there are two forms in the rabbit—the hepatic form caused by *E. steidae* and the intestinal form caused by *E. perforans*. As in the fowl, the organisms are host specific. Carriers are common, and on post-mortem examination coccidia can be found in most adult rabbits. Again the oöcyst requires a sporulation period outside the host of 2 to 16 days before it is again infective, and similar advantage can be taken of this fact to carry out daily cleansing and removal of litter. An even better method is the use of wire floors with sliding trays underneath, or the use of the morant system of housing when the pens can be moved daily, although in this method of management there is always the danger that the ground may have been contaminated by wild rabbits.



Courtesy Purina Mills

Wire floors with sliding trays underneath aid in preventing coccidiosis

Water and food containers should be raised above the floor of the hutch to prevent contamination with feces. A 10% aqueous solution of ammonia is again the most efficient disinfectant. The disease may be introduced by food grown on ground manured by rabbit feces or contaminated by wild rabbits, or by the use of infected second-hand hutches or utensils. Since adults are frequently carriers, young stock must be isolated from older rabbits as soon as possible and overcrowding avoided. In young rabbits the symptoms are usually acute, and death may occur in two to three days without apparent ill health. In less acute cases there is dullness and ravenous appetite followed by rapid emaciation. There is usually diarrhea followed by coma or convulsions immediately before death. On post-mortem examination the liver shows multiple pinpoint, whitish areas, and the bile ducts may be thickened and appear as irregular white streaks. Microscopical examination of smears shows masses of oöcysts present in these nodules and in the bile ducts and gall bladders. In the intestinal form the wall of the small intestine is thickened and corrugated and may show multiple small white nodules.

The second commonest condition we have encountered is a disease at present under investigation at Weybridge. So far the cause has not been established but it is certainly not bacterial in origin, and may possibly be due to a filtrable virus since in many cases it would appear to be infectious.

The disease was first brought to our no-

*Presented at meeting of The Central Veterinary Society, Red Lion Square, London. *Vet. Rec.* 55:7, pp. 84-86.

tice some twelve months ago, and since then we have encountered over 200 outbreaks. The mortality varies enormously from a few rabbits to, in some cases, more than 100 young animals, depending on the number of litters involved. Usually, once the disease shows itself in a litter the whole litter is lost. The disease affects rabbits from between two and twelve weeks of age and is commonest about weaning time. As a rule the does of affected litters and bucks with which they were mated remain normal.

There are usually no premonitory symptoms, rabbits simply being found dead, or occasionally showing paralytic or convulsive symptoms for a few hours before death. Some owners state that affected rabbits cry out before death, and that the head is bent back rigidly towards the spine. On post-mortem examination all organs appear normal and so far the exact pathological process concerned has not been found. Coccidiosis can apparently co-exist but does not appear to be the primary cause, and many outbreaks fail to show any coccidia present.

Coccidiosis and worms caused about nine-tenths of the outbreaks of disease among domestic rabbits which were investigated during the period, October 1, 1940, to September 30, 1942 (Table I). The source of many of these outbreaks was traced to "carrier" does which had been purchased from advertised rabbitries. On testing the dung of 178 in-contact adult breeders we found 82 with coccidiosis only, nine with stomach worm only and four with coccidiosis combined with stomach worm. Thus it would appear that purchasers of breeding stock today have an even chance of buying in bowel parasites. As in the case of poultry the dung-testing of new purchases and the management of the rabbitry on sanitary principles are essential preventive measures.

Tuberculosis is probably the next most common disease and requires little comment. There are two forms. One is an acute miliary type of infection in which death may occur three or four days after symptoms of labored respiration and obvious distress, but with no marked loss of condition. In this form multiple small white tubercles are found scattered throughout the lungs, liver, spleen and kidneys.

The chronic form shows the usual progressive loss of weight and emaciation. On post-mortem examination the lungs are usually the only organs involved, when there is often complete consolidation with little normal tissue remaining, the lesions appearing as large gray-white areas of caseation.

TABLE I—SHOWING THE CAUSE OF OUTBREAKS OF DISEASE AMONG DOMESTICATED RABBITS ON 127 PREMISES AND WILD RABBITS AND HARES ON 27 ESTATES

Cause of Disease	Domestic Rabbits		Wild Rabbits and Hares	
	No.	%	No.	%
Parasites				
Pasteurellosis	4	4.7	—	7.4
Tuberculosis	2		—	
Staphylococcus	—		2	
Coccidiosis	97	76.5	5	18.5
Graphidium Strigosum	16	13.4	12	44.4
Trichostrongylosis	1		—	
Scabies	—		2	
Physical				
Injuries	—		1	
Malformations	2		4	
Morbidity				
Fatty liver	1		—	
Intrinsic factors				
Neoplasia	2		1	
Not diagnosed	2		—	
Totals	127		27	

Although we have as yet no definite evidence, it is our opinion that it is usually the bovine strain of the tubercle bacillus which is involved. The tuberculin test is, of course, widely used experimentally in typing the strains of the tubercle bacillus, and might be of practical value in the case of valuable breeding stock.

Pseudotuberculosis caused by the *Pasteurella pseudo-tuberculosis rodentium* has been observed on a number of occasions. Clinically and pathologically it closely resembles tuberculosis, and can only be differentiated culturally and microscopically. The disease runs a chronic course of three to four weeks with progressive weakness and emaciation and on post-mortem examination typical tubercle-like nodules are found in the lungs, liver, spleen and kidneys.

Snuffles or contagious catarrh is referred to as one of the commonest and most serious diseases of rabbits, but I have not yet

seen an epidemic. Whether this is a true indication of the present rarity of the condition or whether it is due to the fact that the disease is so well recognized by breeders that carcasses are not sent for examination, is difficult to say.

The other infectious conditions, such as Schmorls' disease (an ulcerative condition of the face caused by *Fusiformis necrophorus*), strangles, rabbit syphilis or vent disease, salmonella infections and hemorrhagic septicemia, are apparently comparatively rare in this country.

Mange can be extremely serious and can spread with rapidity throughout a rabbitry. There are two forms, ear mange or canker, caused by *Psoroptes communis cuniculi* or *Chorioptes cuniculi*, and the more serious body mange caused by *Sarcoptes cuniculi* and *Notoedres cuniculi*. The disease closely resembles mange in the dog, and responds to the same treatment. Owing to the rapidity of its spread it is doubtful if treatment can be recommended for body mange and it is often more economical to advise slaughter, cremation of carcasses and bedding, and disinfection.

With the exception of tapeworm cysts intestinal parasites do not appear to be of much pathogenic importance. There are two forms of tapeworm cysts, *Cysticercus pisiformis*, which appears as multiple watery-like blebs on the liver, peritoneum and mesentery, and *Coenurus serialis*, which occurs in the subcutaneous tissues of the neck and shoulder region. Both are the larval forms of adult tapeworms of the dog.

The non-specific diseases most commonly seen in rabbits are those due to dietetic errors, such as pot belly, wool balls (mostly seen in long-haired breeds such as Angoras), sore hocks, a condition usually associated with close confinement under insanitary conditions, mammitis and pneumonia. We have also seen volvulus, intussusception and, on two occasions, fracture of both hind legs above the stifle joint. The reason for this latter condition was not ascertained, the history simply being that the animals were found lying in the hutches showing paralysis of the hind limbs.

As in backyard poultry, the control of the rabbit diseases is mainly a question of hygienic housing and reasonable feeding. Hutches should be dry, light and well ventilated, and if possible so constructed as to

***Taenia pisiformis*, one of the tape worms of the dog—the larval stage is a small cysticercus, found in the cavities of hares and rabbits**

allow fecal pellets and urine to drop through the bottom into a movable tray, which should be emptied daily and disinfected regularly. Food and water containers should be earthenware and should be raised above the floor level. Rabbit manure should never be used on ground where rabbit foodstuffs are grown. Dogs should either be precluded or kept free from tapeworms. Young stock should be weaned as soon as possible, and kept well separated from mature animals.

* * * *

Sound Advice

Letters from unfortunate rabbit keepers show that the first death is regarded as a bit of bad luck, the second starts a train of thought; but it is not till three or four have died that action is taken. By this time it is too late to arrest the spread of infection. Considerable loss may be avoided if a carcass is sent to a reliable laboratory and a veterinarian called; for to know the real cause of the deaths is probably to prevent further losses.—*Vet. Rec.*

Autobiography of a Veterinary Practitioner

By E. T. BAKER, Moscow, Idaho

XIV

Financial Side of Practice

MAGAZINES, books, bulletins and other literature are filled with therapeutic articles, but how much is ever given on the art of making a living in practice? How many young men know how to handle a client, or what a reasonable fee should be? How many practitioners, even of some years of experience, know how much they really clear, or, if they show any profit at the end of the year?

Other men merely use their practices to make enough money to invest in something else, that may or may not prove to be profitable. Others are spending more money for supplies than they take in, and wonder why they are always hard up. Some practitioners like to be "big business men," and put on a false front, and appear in a new and expensive car every few months. In other words, it takes all kinds of people to make a world, and the same holds true of our profession.

Therefore, with this explanation, and the fact no attempt is made to act as a financial guide to anyone, I will merely outline a few observations on the important art of making a living in practice. I have not made an exceptional financial success of my own life so far, but if I were to die tomorrow, my family would have fifteen or twenty thousand dollars, with no debts, to tide them over. I mention this merely to show that I have tried to practice what I preach, and that is to save just a little more than one spends. Even a few hundred dollars laid by each year will amount to a respectable amount at the end of twenty or thirty years of work. As one grows older, he spends less, or his wants are fewer. Personally, I have always thought the Townsend Plan was slightly backwards, for it is the young people, in the early days of their marriage, that need a pension more than at any other time of life, provided they have been healthy and able to make a reasonable income. I have always been under the impression an old age pension is a mighty fine idea, for, then the average greedy person would have little excuse in saving up a big amount for old age, as it is always expressed. This is such a large and wealthy country that no one should go hungry or shabbily clothed. Perhaps my old newspaper reporting days when I saw the most abject poverty still sticks in my mind. During one coal strike, I saw one white-faced woman and two hungry looking boys walking around the countryside, asking if they could spear pieces of bread out of swill barrels. This sounds almost incredible in a land of plenty and full of christian people who send vast amounts of money abroad each year for missionary work. I have had old men, feeble, weak from hunger, come to our back door for a hand-out, which they always got, and then some. Many of these men have their own misdeeds to thank for an empty and forlorn old age, but that is over the dam, and their lives are here before us. It is because I have seen so many of these cases all over the country, from the Atlantic to the Pacific and from the Canadian line to the Gulf of Mexico, that I have always preached frugality and thrift. I like to go into winter with all my bills paid, and the coal house and cellar full. I

"I have seen destitute people from the Atlantic to the Pacific—from Canada to the Gulf of Mexico"

like to have a checking account of from five hundred to a thousand dollars for any emergency. I like to have money in my pocket to spend when I want to, and not be forever in debt or so financially anemic I have to buy a quart of gasoline at a time.

An Important Item

Let me mention a trivial little fact not commonly dealt with in scientific literature. I refer to the payment of the bill.

About 25 years ago I said pleasantly to a client who had his check book stripped for action:

"Don't bother about that now; wait and see how she comes out."

He took me at my word and never bothered again.

You see, I had been inseminated with the idea that the sole aim in life was to serve the public, and that they would bring our fees to us on a silver plate. In all innocence, I thought that they would be so grateful they would almost break a leg running down to our house before breakfast to pay a bill.

It was then and there I learned that the proper time to gracefully flip a check or a piece of Uncle Sam's green paper into my pocket was when the client's brain was in such a dizzy whirl he offered to pay. According to the sixth verse of the third chapter of Ecclesiastes there is "a time to get, and a time to lose."

And that, brother, means just what it says.

Collections

However you look at it, this subject is dependent on local conditions. No two practitioners can use the same methods. Therefore, I will give my system which I have found fairly successful in my community.

Living in a grain growing and dairying section, I have several pay days. First, our dairymen pay every month or so; the sheep men when they sell some wool or lambs; pig raisers when they sell the finished hogs, and grain growers any time they sell their grain.

When a farmer tells me he will "pay me in the fall," one never knows what fall he may mean. Owing a bill does not seem to hurt the feelings of the younger generation, and if I happen to meet him when he has the money he may "cough up."

Twenty years ago, before the day of the caterpillar and the combine, our grain was threshed by stationary outfits, each employing from ten to twenty men and a dozen teams. Usually, the owner's wife and daughters ran the "cook shack." This outfit went from ranch to ranch, and were usually out from six weeks to a couple months, depending on the season. As a rule, our wheat runs around thirty bushels to the acre, and other grains in proportion. Peas, in good years, may yield ten to fifteen sacks, of 140 pounds each, and beans average three to five sacks. After the run was through, the thresherman would go to the bank and borrow enough to pay off the help. The latter, especially those owning teams and who had called me during the year, would pay our bill, and then go around to the various

"Combining" Wheat in the Northwest

stores, paying their bills and buying sugar, flour and other supplies. They would also outfit their "kids" for school, and considered the payment of a bill an honorable obligation. This was before the days of relief and mechanized farming.

Now, a combine and caterpillar, with a crew of three or four men, will take care of all the grain in one locality, and the little fellow, who used to go out "harvestin'," has no income. Instead of the average farm being 160 to 320 acres, it now runs from a section to three or four thousand acres. The owner lives in town, and does not keep a cow, horse, pig or even raise a garden. He receives an allotment check from the government for not raising grain, and the more wheat he does not raise the bigger check he receives. These checks allow him to go to California for the winter or to buy out his smaller neighbor, so that the rich are getting richer and the poor are getting poorer. As one old farmer said: "By Gawd, ef it ain't a qua'r generation!"

Perhaps when the government pays us for not making calls, and gives a monthly check to wives for not cooking meals, and laboring men for not working, this will be an ideal country to live in. But, you may ask, who is going to pay the bill? As a congressman would wave his arms and reply: "From the lakes and storm lashed shores of Maine to the sunny climes of California, my fellow citizens are basking in the greatest country God ever created. When I am re-elected, I will vote for the common people and for them alone."

However, as simple minded taxpayers and practitioners who do not know any better, we should leave these questions for the politicians to settle, as they will do it anyway.

My statements are printed on the same kind of bond paper and in the same type as my other stationery. This is six-point Gothic, and I prefer dark blue ink. I keep a record of my calls and the charge in an old Mulford 1913 price list. As I have only about a dozen of these books, I have to erase the writing in some of the older ones and use them over again. This shows what a one-track mind I possess. At the end of the month, I make my statements out in duplicate, sending out the original and keeping the duplicate on my desk. When the bill is paid, the duplicate is filed, and the amount written in the call book.

As a rule, I am not much of a person to "dun" people, and to many, only send out one statement a year, usually September Morn. I find people pay better than when not hounded to death. Then again, if one of my clients happens to have a death in his family, or a long siege of sickness, I do not bother him. When an old client dies and leaves his widow in poor circumstances, I send her a receipt in full.

When a bill becomes $50 or more, it is harder to collect, as a rule. I try to get busy on the smaller amounts.

Another peculiarity we have carried out for some years is to add "four-bits" or fifty cents to each call. If one makes a few hundred calls a year, it soon counts up, and helps to take up the slack on lost accounts, and hurts no one.

Many practitioners are always in a dither because they do not pay much attention to their net returns, but go more on the gross, and live accordingly. For example, let us say you had a gross of $3,000 last year. You were unable to collect $500 of this, and probably spent $100 in losing that, which amounts to $600. Your car upkeep amounted to $350, and your drugs, biologics and other supplies $400 more. Then, there is $250 for insurance, association dues, magazines, and the like, which makes $1400 net. If you have lived at the rate of $100 a month, you will come out about clear; if, on the contrary, you imagine yourself to be a "three thousand dollar a year guy," and have lived accordingly, the banker will be looking at you with a faraway gaze.

Years of experience have taught me a $4,000 a year practice is about equivalent to a $2400 a year salary in good years, and to an $1800 salary in poor ones. Of course, I am just using this as an example.

I try to put by a few hundred each year, and figure if I am worth around fifteen or twenty thousand dollars when I am sixty-five, I will not die in the poor house. If, however, I think I am worth twenty thou-

sand dollars with about nineteen thousand dollars in debts or liabilities, my widow can live with her children or go to work in her old age.

A $4000 practice is equivalent to a $2400 salary

As practitioners, we see so much of this among our clients. I know farmers who are operating several thousand acres of land who hardly own a respectable equity in it. It would be far better if he owned eighty or one hundred and sixty out of debt. I think the man with $5,000 in honest-to-God assets is better fixed than the person with $40,000 in so-called assets and $39,000 in invisible liabilities.

Get-Rich-Quick Schemes

One of our leading physicians and surgeons, who enjoyed a $60,000 a year income, was a bright and shining mark for all kinds of sharpers. Even when he way dying, he would have taken an option on heaven, and sublet his lease to the first oil or mining salesman who happened along. He told me once he had invested over a quarter of a million dollars in various types of phooey corporations, ranging from rubber plantations to Mexican mines.

Lest the reader think I am using the above as a horrible example, and that I was too bright to be "taken in," let me relate this sad story of frustrated ambitions and misplaced confidence. It was not a large investment, but it represented several years of toil on my part. Soon after coming west, I roomed and boarded with a family, who finally inveigled me into putting a thousand dollars into a small poultry ranch they wished to run. Now, many a better man than myself has been taken in on chickens, but these happened to be the feathered variety. My partner was a competent poultry man, but his chief interest in life was to keep the distilling industry running at full blast. To make a long story much shorter, I lost just $2,300 in two years. However, I consider it money well spent, and Mother Experience is hereby thanked for having conferred this advanced degree on me while I was young, single and could take it.

When a kid-gloved sharper drops in at my home in an effort to make me rich, I mix up an appropriate drink for the occasion, ranging from a Tom Collins in summer to a Tom and Jerry in the depths of winter. In a short time, while sitting around partaking of the friendly glass or cup, I begin telling him how poor collections have been, and in a short time, tears begin rolling down his cheeks. One salesman, who was attempting to sell me some lots over on the coast that would be four feet under water when the tide came in, almost broke down and cried. They leave our house thankful they have not "skinned" such a poverty-stricken family, and, as the wife washes the glasses, she sometimes mentions a Biblical character, whose maiden name was Ananias. This is known as "beating the moocher to the touch," with such hospitality, he leaves in the best of humor.

With the exception of slow horses and fast women, nothing will keep the average professional man broke so continuously as a desire to get rich quick. It is a laudable ambition, but many are called and few are chosen. How persistent is this desire may be illustrated by the case of an old prospector, whose name was Adam Karrico. Over forty years ago he had started in mining, and was fortunate enough to pick up several nuggets worth around a hundred dollars apiece the first month out. Then, for nearly thirty-five years he merely eked out a living by "pannin' " various "cricks." While up in the mountains one day doctoring some sheep, I found old Adam, bent, rheumatic, half blind, but still as optimistic

as ever. He had hardly anything to eat in his miserable cabin, but he was as cheery and confident as ever.

"Boy," he said to me, "ef I kin jest find this here mother lode, I'll be shovelin' it out like th' mint."

I slipped him a dollar to buy some "smokin' terbaccer an' snoose," and did not hear about him for several years. Then, one day, while out at the poor farm doctoring a cow with milk fever, the superintendent said:

"You remember old Adam Karrico, don't you? Well, we got him here."

I went in to see him, and found him totally blind, paralyzed, but still "rarin' to go."

"That you, Doc," he smiled, as he heard my voice, and held out his worn and wrinkled hand. "Glad to see yuh. Jest wait till these old laigs git so they kin tromp them Hoodoos again, an' I'll find 'er. Yes sir, Doc, them hills is jest full of gold."

A month or so later, the county returned to earth the mortal remains of poor, old Adam. I like to picture his simple, harmless soul saying to St. Peter as he joyfully looked at the golden streets:

"Pete, blamed ef yuh ain't got somethin' here. Git me a pan, an' I'll run some out fer yuh!"

The Lost Client

Due to some misunderstanding or unfortunate circumstance, a client may be lost temporarily or forever. One of the hardest things to learn is why some people dislike us, even if we have never had any business dealings with them. Perhaps as good a reason as any for this may be found in a woman's "because." I like certain people because I like them. I cannot give any good explanation. It just happens, and the sooner we learn everyone will not like us, the better. In some cases, a person does not like me because I have prospered, perhaps more than he has. Others may take a dislike to me for some fancied grievance or something I have said as a joke. A few dislike me because they just don't like me. However, as long as more people like me than dislike me, I will be able to conduct my practice in much the same way as for the past twenty-seven years.

Every practitioner knows the "hard luck" farmer. If anyone's hogs get the cholera, it is his. If a hailstorm comes through the section, his wheat gets the worst of it. If only one fatal case of milk fever occurs, it is his cow, and so on. For example, let me mention Charlie Dale, who lived about ten miles from me. He was an average rancher,

Results will make or break a practitioner

with the usual run of stock. My first call to his place, years ago, was to see a colicky mare, heavy with foal. When I arrived, she was sitting up on her rump, with greenish secretions coming from her nostrils, with a very typical case of rupture of the stomach. She died in about fifteen minutes after my arrival. My second case was that of a milk fever in a cow, badly bloated, with a complete eversion. I worked like a Trojan, but she died. The third call was to see a purebred buck with pneumonia, probably of a hemorrhagic type. He died. About this time I began to think I was "hexed" on his place, or he was the victim of some mighty bad luck. I made my fees moderate, for he had sent for me in plenty of time, but they just happened to be "that kind of cases." We continued to be good friends. Then, one day, while I was away from home, he had a simple, uncomplicated case of milk fever, and had to send for another veterinarian, who lived about twenty miles away. Of course, the patient made a beautiful recovery. After that, for some years, he called this man, as he figured it was sure death to call me. Then, a series of cases died for this other practitioner, and one day he called me to see a simple case of impaction in a val-

uable mare, and she lived. Since then, I have been doing his work.

This reminds me of a case that happened to a young fellow who had played baseball with me, and who later graduated from medical school. Coming back to his home town, this young doctor, whom we will call George, took over the old family physician's practice. The latter had been there for over forty years, and decided to go to Florida that winter. The very first case George was called to see happened to be the banker's only daughter, a popular and well known young lady. She had what appeared to be a bad case of sore throat, which later developed into diphtheria. In those days, antitoxin was in the experimental stage, and hardly any country physicians were administering it. Not having any of this available, George performed tracheotomy as a last resort, but the girl died. This was a terrible blow to the young physician, but it was only the beginning. The next case was that of the minister, who came down with some form of uremia, probably fatal from the beginning. He died. The next case was that of a young boy, who developed a violent mastoid, and he died. From then on, poor George was avoided like the small pox. People would call doctors far and near, but not George. Realizing his position, he left for the middle west, and became a very successful physician and surgeon.

As mentioned many times, we are judged by our results. If the patient is in a hopeless condition when we arrive, and it dies, we are given the credit for the death. If it happens to be a simple, uncomplicated case, but rolling around considerably, and it recovers, we are also given great credit for its "wonderful cure."

However, one's practice changes from year to year. Old clients die or move away. New clients move in and take over the various farms, and our mistakes that are buried in the back forty are forgotten. A new day dawns each morning. The practitioner keeps on, wondering where the next call will come from. It always does, just about the time he sits down to dinner, or gets ready to see a movie.

I figure out of every 100 clients today, about 70 will be with me next year. Of the thirty absent, probably 20 will quit farming, move away or retire. About five will have no sick stock, and about five will quit because they either don't like me, or doubt my skill as a practitioner. Perhaps I made a mistake of diagnosis, or gave the wrong treatment, who knows? I make just as many mistakes as the average, and I am perfectly frank to admit it. In fact, there was only one man who never made a mistake, and he died before he was born.

(To be continued)

Practice Statistics

No. years in general practice	30
No. calls made	24,000
No. meals interrupted by clients or phone	9,999
No. night calls made	3,500
No. needless night calls made	3,000
No. clients promising to pay "When I see you"	2,350
No. clients going blind	2,300
Amount of charges marked off books	$15,000
Times asked: "It's his water, ain't it, Doc?"	7,313
Times answered: "Yes, you're right; you sure know what's wrong with a horse"	7,313
Times told: "That bull is gentle as a kitten"	475
Times believed above statement	0
Number of government questionnaires filled out	47
Number of questions answered in above	4,700
Number of foolish questions in above	3,860
Number of mud tires allowed for practice	0

—E.T.B.

Pseudohermaphrodism and Plastic Surgery in a Palomino

By ROBERT N. ERICKSON
Manhattan, Kansas

A THREE-YEAR-OLD, light-weight palomino was presented at the veterinary clinic of the Kansas State College for plastic surgery because of an undesirable and abnormal appearance. This animal was quite feminine in appearance and lacked the normal masculine development of an uncastrated horse of that age. Docility was indicated by the fact that the horse was easily broken when taken off the range; moreover, it had been used as a children's riding horse. A penis which was seven inches in length and protruding to the rear, was suspended in a fold of skin which extended from below the anus to approximately twelve inches below the ischial arch (Fig. 1). Thus the long axis of the penis was almost parallel with the long axis of the body.

The penis was infantile but possessed a normal glans penis, prepuce, and urethral opening. Due to the position of the penis, the urethra was dorsal. The entire perineal region and the fold of skin in which the penis was suspended was devoid of hair. There was no definite scrotum and external palpation revealed right and left testicles just outside the external inguinal ring; the left testicle was higher and smaller than the right. Teat development approximated that of a normal three-year-old mare. Since the horse was shipped from Oregon to Kansas, famalial history was lacking.

According to Young's classification, this horse would be considered a male pseudohermaphrodite because of the presence of both testicles. If ovaries are present and no testicles, an animal is considered a female pseudohermaphrodite. There are many theories as to the cause of this condition. Crew believes pseudohermaphrodism is due to an insufficiency of male hormone during ontogency. The laity frequently attribute this condition to inbreeding. This supposition probably is false since close inbreeding is not general in palomino breeding practice. The mating of two palominos does not usually produce a colt of desirable palomino color. Although pseudohermaphrodism in horses may have some genetic relationship, insufficient literature prevents formation of any sound conclusions. Howell reported a case in a draft type horse very similar to this case.

Before and after operation

Surgery.—One week prior to performing a plastic operation, the palomino was castrated. Castration revealed a right testicle size 3½ x 2½cm and a left testicle 3 x 2cm.

The animal was prepared for operation by giving an epidural injection of 15cc of a 1% solution of procaine hydrochloride. No further anesthesia was necessary and the horse was operated upon in lateral recumbency. A median incision was made over the urethra from its termination to a point five inches below the ischial arch. The urethra was then dissected out the entire length of the median incision. Similarly the penis was dissected out from the surrounding skin and ligated at the same point five inches below the ischial arch. Above this point the organ was very small and insignificant. The penis was then transected immediately below the ligature. There was a considerable amount of excess skin in which the penis had been suspended. These flaps of skin were approximated to the natural body contour with the aid of mattress sutures, and the excess clipped off. The dissected urethra was then divided at the point five inches below the ischial arch, and the mucous membrane of the urethra sutured to the surrounding skin, using several interrupted catgut sutures. Suturing brought the urethra to a funnel shaped termination. The operation was performed by Dr. E. R. Frank. The convalescent period was uneventful. By comparing figures 1 and 2, one can readily see the improvement in the appearance of the horse.

Histological Examination.—The seminiferous tubules of the left testicle seemed to be normal in number, but they were small in size. There was an abnormally large amount of loose primitive interstitial connective tissue. The tubules showed no evidence of spermatogenesis, and were, as a general rule, lined with a single to double layer of oval-shaped, vesiculate nuclei with an occasional larger spherical nucleus interspersed. There was no definite demarcation between the cells. According to Maximow the oval-shaped nucleus and wrinkled nuclear membrane is characteristic of the cells of Sertoli, and the larger spherical nucleus of that of spermatogonium. Contrary to usual findings in pseudohermaphrodite and cryptorchid testicles, a definite increase in interstitial cells was lacking. The cytoplasm of the interstitial cells appeared to be more vacuolated than normal.

The tubules of the epididymus were small in size, few and far between with much intervening interstitial connective tissue. The pseudostratified columnar epithelium was lower than normal but showed the usual stereocilia. There were no sperm in the tubules.

The histology of the right testicle was essentially the same except the interstitial cells were nearly normal in number and distribution.

* * * *

Nature Not the Best Doctor

Nature is just as much interested in the parasite as it is in the host. Nature will help the *Brucella abortus* organism just as much as it will the cow; it is just as much interested in the welfare and success of the one organism as the other. It is just as much interested in the fermentative organisms that are causing colic in the horse, as it is in the horse. It is true that the veterinarian should exert every effort to help Nature, but on which side—Nature is on both sides—on the side of the host, of course, if you expect recovery. This impels him to do the least that will be effective in surgery or medication. A thorough realization of the fact that disease is but a battle between the host and the parasite will go a long way to improving our therapeutics. It discourages overmedication, because that lays an additional burden on the host that we want to help. It calls loudly for good nursing, comfort for the patient and supportive treatment. It prevents such oversights as failure to supply sufficient liquid to a dehydrated animal, or failure to clean out a deranged intestinal tract and thereby relieve the animal of toxins because the main site of the disease is in the lungs. It prevents us from overlooking a whole lot of things, each of which may contribute in some small way to reinforcing the host in his battle, furnishing him a battalion here and another there, as it were.

Elephantiasis in a Hereford

A white-faced, 2-year-old, 700-pound heifer was presented for inspection before slaughter at the Cudahy packing plant in Kansas City in August, 1942.

On examination the following observations were noted by B.A.I. veterinarians L. S. Smith, L. F. Heydecker and myself.

The animal was normal except for enlargement of the limbs and tail. Tempera-

Fig. 1. Elephantiasis in a Hereford calf

ture was 103.4°F. and the temperature of the affected parts was normal. No icterus or anemia was shown by mucous membranes. The animal apparently was in good health and excellent condition. All four legs were enlarged from two to three times normal size with a consistency slightly firmer than normal flesh. No crepitation or gas was felt under the thickened skin. Wrinkles on the ventral surface of the abdomen showed that, at an earlier date, swelling had extended to that region.

Post-mortem inspection: The skin over the legs, tail and abdomen was found of a thickness of from 1 to 2 inches, with tough elastic connective tissue. The fascia immediately underlying the thickened skin and overlying the muscles was extensively edematous, as was the intermuscular connective tissue of the heavy leg muscles. The

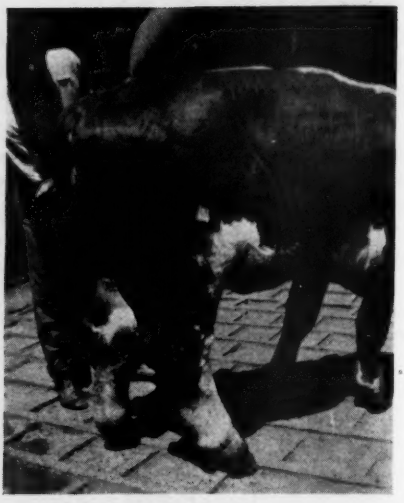


Fig. 2. Different view of Fig. 1.

lymph glands of the legs and the prescapular, inguinal, and prefemoral glands were slightly enlarged and edematous. There was no abnormal odor to the tissues or edematous, straw-colored fluids. The heart appeared perfectly normal. There was a slight enlargement of the liver but all other visceral organs were normal as were the greater arteries and veins of the legs and body. The abdominal wall was thickened, with about thrice the normal amount of connective tissue which was very tough.

The owner offered the following history: This animal was bred and raised in central Missouri. Noticeable enlargement of limbs and tail began at the age of six months, and gradually increased to the present condition. The heifer was not affected by common calfhood ailments, nor at any time had it been diseased, other than the chronic thickening of the skin.

Packing company skinners, who had been on the job for many years, stated they had never before skinned a cow showing any similar condition of the skin.

The carcass was condemned on postmortem examination and tanked. Specimens were carefully selected to send to laboratories for diagnosis, but were mistakenly destroyed when left in the plant overnight.

JOHN P. GARRETT

Carterville, Mo.

Fibro-Sarcoma in Hock Region of a Cow

In August, 1942, Dr. C. C. Moore of Carthage, Missouri, was called to a nearby farm to remove a tumor from the hock region of a four-year-old, grade Jersey cow. The owner reported that a small lump was observed when the cow was a calf and that it had grown steadily since, although it seemed to have been growing at an increased rate during the preceding six months.

Examination revealed a spherical pedunculated neoplasm attached to the antero-lateral surface of the joint. The outer surface of the neoplasm was hairless and much scarred by continual traumatic injury. It measured eight inches in diameter with a five-inch base.

Sarcomatosis in a Jersey cow

The growth was unsightly and since the pendulous nature caused much difficulty in walking it was decided advisable to remove it. Also, as the post-operative scar would probably be comparitively small the market value of the cow would thus be increased.

The animal was prepared for the operation by giving one and one-half ounces of chloral hydrate intravenously. Complete anesthesia resulted immediately and the cow was placed in lateral recumbency. The area was thoroughly shaved and disinfected. An elliptical incision was made on both sides of the base of the growth and thereafter blunt dissection was employed. Great care was exercised in the removal as the lateral tarsal vein was involved. Hemorrhage was profuse and it was necessary to ligate several of the large vessels supplying the tumor. The skin was sutured with a series of interrupted linen sutures and healing by first intention was secured.

The tumor, after removal weighed eight pounds, and was heavily encapsulated. A section was sent to the Veterinary pathology department of the college. Laboratory examination indicated that the tumor was malignant, since it was composed of many vesiculate fibroblasts, a few of which had mitotic figures present in the nuclei.

GEORGE ATKINSON.

Hutchinson, Kans.

Submaxillary Abscess in a Cat

December 7, 1942, a ten-year-old, spotted, female Angora cat was admitted to the veterinary clinic of the Kansas State College with the history of having refused food for 10 days.

Physical examination revealed a large swelling one inch in diameter under the right mandible. The right submaxillary lymph gland was one-half inch long and one-eighth inch in diameter. There was lacrimation from the right eye and the cat was greatly distressed. Severe pain was produced when the mouth was opened for examination. Fluoroscopic examination failed to reveal any involvement of the mandible in the enlarged area. The temperature was 103°F.

Hot packs of magnesium sulphate were applied locally to reduce the inflammation and the cat was force fed. On the following day a fluctuating area developed in the mouth just behind the lower right fourth molar tooth. This swelling was incised and a large amount of pus was discharged; the discharge continuing for three days. The tooth was thought to be infected and was extracted with considerable traction. However, it showed no evidence of involvement and no pus was discharged from the alveolus. The hot packs were continued and 7½ gr sulfanilamide given daily *per os*.

The right eye was involved secondarily and the swelling of the surrounding tissues caused protusion of the membrana nicitans. Keratitis ensued and a 1% mercurous oxide ointment was instilled into the conjunctival sac daily.

The sulfanilamide treatment was continued for one week at which time the cat was released from the hospital. The swelling was entirely gone from the submaxillary region and only a slight keratitis remained.

CARROLL MILLS.

Blaine, Kans.

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Buccal Papillomatosis in an Irish Setter

August 19, 1942, a male Irish setter, 11 years of age, was presented to the Veterinary clinic of the Kansas State College for examination. In addition to opacities of the cornea in both eyes, resulting in total blindness, evidenced by the animals predisposition to run headlong into obstructions, and a tumor of the left testicle causing the latter to appear one-half again as large as the right, buccal papillomas involving the upper gums extensively and the lower gums only slightly, were disclosed.

In reviewing the literature for information concerning buccal papillomatosis the following observations were noted: "Diseases of the Mouth and Esophagus of Carnivora," by Dr. L. A. Merillat, VETERINARY MEDICINE, 29:280. The condition is caused by a filterable virus, is contagious, and one attack confers a high degree of immunity.

"Buccal Papillomata in Dogs," VETERINARY MEDICINE, 31:396, "Buccal Papillomas of Dogs," VETERINARY MEDICINE, 18:1129, and "Internal Medication for Warts," VETERINARY MEDICINE, 18:63. "The treatment consists of Fowler's solution of arsenic, 10 to 20 minims in milk or water three times daily, or sodium cacodylate, one to three grains daily subcutaneously.

"Papillomas can be tied off with suture material, snipped off with scissors, or cauterized with the actual cautery or a chemical, if the involvement is slight."

"Infectious Oral Papillomatosis of Dogs", *Journal of the A. V. M. A.*, 33:810. "The virus possesses great specificity and can affect only the cells of the mouth, the incubation period is 30 to 33 days or 10 days longer in sickly or undernourished dogs. All healthy dogs not having been previously

Papillomatosis of the mouth

infected are susceptible. One attack confers permanent immunity.

"Neoplasms of Domesticated Animals," by W. H. Feldman, informs us that papillomas of puppies are probably transmitted from dog to dog by their taking hold of each others' mouths while playing, many times the claims of successful treatment are undeserved as usually the papillomas gradually shrink and are absorbed spontaneously. Hobday made the suggestion that a saturated solution of tannic acid be used three times daily for several days when the involvement is extensive.

"Animal Pathology," by Runnells, describes the condition as a virus disease of puppies stating that the warts disappear spontaneously, a high degree of immunity is produced. and that the incubation period is 30 to 33 days or 10 days longer in sickly or undernourished puppies than in healthy animals, and that basophilic intranuclear bodies similar to Lipschutz bodies in human warts are found. Due to the advanced age of the animal, its total blindness, and the assumption that the tumor of the left testicle was malignant, the owner was advised that treatment would be a waste of time and money and that the animal should be destroyed to prevent suffering.

Manhattan, Kans. GEORGE E. SHORT.